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Tuberculosis in Foreign Lands.—

GERMANY

Reports revealing the ravages of tuberculosis during the war are now available for all Germany. During the five years, 1914 to 1918 inclusive, Germany lost from tuberculosis alone 575,000 lives.

*Germany—Tuberculosis mortality, 1905 to 1920**

YEAR	NUMBER OF DEATHS		RATE PER 100,000	
	Pulmonary and Miliary	All Forms	Pulmonary and Miliary	All Forms
1905	109,723	121,992	181	204
1906	98,152	113,432	164	189
1907	97,555	111,329	159	182
1908	95,402	109,193	154	176
1909	90,962	105,910	144	168
1910	89,327	104,322	140	164
1911	89,927	103,470	139	160
1912	87,389	100,302	134	153
1913	82,193	94,927	124	143
1914	77,877	92,916	124	142
1915	84,646	96,660	130	148
1916	91,761	105,257	141	162
1917	117,702	133,223	182	206
1918	131,434	147,733	204	229
1919	114,480	131,260	185	212
1920	79,577	92,793	132	154

* From the Statistical Year Book of Germany, 1921–22.

The postwar census of October, 1919, showed in Germany a total remaining population of 59,857,283, which contained 2,500,000 fewer males than females. A generation ago, in 1905, the death rate from tuberculosis in Germany was 204 per 100,000. From that time to the war period, tuberculosis declined, having been lowest in 1914 when the rate of 142 was 30 per cent below that of ten years before. The war period and the blockade made their influence first felt in 1914 by arresting any further progress against tuberculosis. In 1915 the rate rose six points higher, but in 1916 there was an increase of 12,000 deaths over prewar figures and a still increasing number of victims were taken in 1917 and in 1918. In the latter year, 54,817 more deaths from tuberculosis occurred than in 1914. The number of deaths from all forms of tuberculosis during the last year of the war (1918) totalled 147,733, as against 92,916 in 1914. The death rate of 1918 was 229 per 100,000 population as against 142 in 1914, and represented a 40 per cent rise over that of four years before. In 1919 a first slight recession took place, which in 1920 became accelerated, the rate during 1920 being 154 per 100,000 population, or 30 per cent lower than two years before. During the seven years from 1914 to 1920, inclusive, tuberculosis alone killed 800,000 people in Germany.

Bavaria and Prussia: The greatest amount of tuberculosis occurred in the cities, but no part of the empire was spared. Bavaria, with a population of more than 7,000,000 people, in the three years of 1918, 1919, 1920, lost 38,472 lives from tuberculosis; the death rate during each of those three years having been, in order named, 205, 186 and 151 per 100,000. Prussia, which contains the largest group of people in Germany, had a slightly higher death rate

from tuberculosis than the country as a whole, that of 1919 being still 215.

German Cities: During 1920, in the three hundred cities in Germany having a population of more than 15,000, the tuberculosis death rate was 183 per 100,000 while that of the entire country, which includes the rural and urban sections, was 154. During the first quarter of 1921 the rate in forty-six of the largest German cities, which contain a population of almost 17,000,000, was still 183; in 1922, during the same quarter, the rate remained almost stationary at 182, but in 1923, during the first three months of the year, the rate was up to 208, or twenty-six points higher than the year before.

Mortality in Each Sex: Previous to the war the tuberculosis rate in Germany among males was slighty higher than among females, having been 148 in 1914, or eleven points higher than among the girls and women. The disparity against the men continued during the war and until 1919, when the mortality in the two sexes became equal; but since that time there has been a reversal, and the indications now are of a higher tuberculosis rate among women. The effect of the war upon children in Germany and the increase in tuberculosis among them have

*Germany—Tuberculosis mortality in each sex, 1914 to 1920**

YEAR AND SEX	NUMBER OF TUBERCULOSIS DEATHS				RATE PER 100,000 POPULATION			
	Pulmonary	Other organs	Acute miliary	Total deaths	Pulmonary	Other organs	Acute miliary	All forms
1914:								
Total	76,630	12,039	1,247	92,916	122	18	2	142
Males	40,902	6,042	644	47,588	127	19	2	148
Females	38,728	5,997	603	45,328	117	18	2	147
1915:								
Total	83,434	12,014	1,212	96,660	128	18	2	148
Males	42,908	6,101	618	49,627	134	19	2	155
Females	40,526	5,913	594	47,033	122	18	2	142
1916:								
Total	90,574	13,496	1,187	105,257	139	21	2	162
Males	44,921	6,776	590	52,287	142	21	2	165
Females	45,653	6,720	597	52,970	137	20	2	159
1917:								
Total	116,265	15,521	1,437	133,223	180	24	2	206
Males	57,651	7,662	750	66,063	183	24	2	209
Females	58,614	7,859	687	67,160	176	24	2	202
1918:								
Total	129,933	16,299	1,501	147,733	202	25	2	229
Males	63,325	7,941	745	72,011	204	26	2	232
Females	66,608	8,358	756	75,522	201	25	2	228
1919:								
Total	112,813	16,780	1,667	131,260	182	27	3	212
Males	53,789	8,240	779	62,808	181	28	3	212
Females	59,024	8,540	888	68,452	183	26	3	212
1920:								
Total	78,401	13,216	1,176	92,793	130	22	2	154
Males	36,392	6,386	578	43,356	126	22	2	150
Females	42,009	6,830	598	49,437	134	22	2	158

* Based on Reports of Health Officers from 23 States, exclusive of Alsace-Lorraine, Schwerin and Mecklenburg, Strelitz and, after the War, of the provinces or territories ceded.

been noted by a number of observers. The figures at hand for Germany for forms other than pulmonary are naturally furnished mostly by the children. The death rates from tuberculosis in other organs than the lungs formerly averaged 18 per 100,000 population in Germany; they rose slowly but steadily through the war and, contrary to the experience in adults, did not recede in 1919 but went still higher. The past and recent events in Germany have obviously made a permanent imprint upon the future generations in that country, and its influence will long be felt.

BOMBAY

Tuberculosis in Bombay has been following to a certain extent a course similar to that in other countries during and since the war. Among the population of 1,200,473, there were 1,473 deaths from tuberculosis in 1922, or a mortality rate of 122 per 100,000. The bulk of the population are Hindus of various castes; but, besides 900,000 Indians, there are 185,000 Mussulmans, 52,000 Parsees and a scattering of Jews, Anglo-Indians, etc., among whom there are quite varying rates from tuberculosis. For instance, while the general tuberculosis rate in Bombay averaged 122 per 100,000 during 1922, that of the Jews was only 65. On the other hand, the Mohammedans in India suffer from tuberculosis much more than the natives. The death rate of the Mussulmans in Bombay was 208, or 70 per cent higher than the average. The mortality of the Brahmans, or priestly class, is 40 per cent lower than the average. The population of Bombay is of an unusual composition in its division of the sexes. Two-thirds of the entire city are males; hence the special significance as regards tuberculosis in the almost equal divisions of the number of deaths. The death rate from tuberculosis in 1922 among males in Bombay was 96.3 per 100,000, while among females it was 80 per cent higher, or 172.8. The inference of greater physical burdens being borne by the women in India is obvious. During the war tuberculosis in India increased, as elsewhere, the annual details since 1912 being as above.

*Bombay—Tuberculosis mortality since 1912**

YEAR	TUBERCULOSIS DEATHS	RATE PER 100,000
1912	2,794	285
1913	2,152	219
1914	1,889	192
1915	1,710	174
1916	1,902	194
1917	2,118	216
1918	2,513	256
1919	2,780	283
1920	1,841	187
1921	1,614	137
1922	1,473	122

* For all forms of tuberculosis from 1922 Report Executive Health Officer.

CANADA

In Canada, during 1922, tuberculosis took a total of 7,707 victims among the 9,000,000 people. The death rate from all forms of tuberculosis in Canada was therefore 87 per 100,000 inhabitants, as against 88 in 1921. In the more agricultural Western provinces of Saskatchewan, Alberta and Manitoba very low rates prevail. On the other hand, a greater loss from tuberculosis is suffered in the maritime provinces of New Brunswick, Prince Edward Island and Nova Scotia, where the rates are practically double those of the Western provinces. If the rates were standardized on the basis of populations of similar age and sex composition, the mortality from tuberculosis in the Eastern provinces would be shown to be still higher. With a greater proportion of children and older folks than in the West, the tuberculosis mortality in the East should, for that reason alone, have shown a lower crude rate. The details of the tuberculosis mortality in the nine Canadian provinces, exclusive of the unorganized Yukon and Northwestern Territories, in 1921 and 1922, were the following:

Montreal: The Canadian metropolis, with a total population of 630,000, had 940 deaths from tuberculosis during 1922. The tuberculosis death rate is, therefore, now 149 per 100,000. In 1912, it was 215, a decline, therefore, during ten years of 32 per cent. In Montreal the French-Canadians number some 400,000, or almost two-thirds of the entire population. The British-Canadians, approximately 150,000 in number, are about one-fourth of the city's population. There are, in addition, more than 45,000 Jews, and another 50,000 of different foreign nationalities. Tuberculosis prevails among the various groups at very different rates. It is especially high among the French-Canadians, their death rate in 1922, on the basis of the official census, having been 161, whereas that of the British-Canadians was twenty-eight points lower, or 133. Jews, in Montreal as elsewhere, have a lower tuberculosis death

rate than other nationalities. The Department of Health of the City of Montreal collects its vital statistics separately for this group, and the tuberculosis figures of 1922 indicated a death rate of only 49 per 100,000 among the Jews. This is a rate 63 per cent less than that of the French-Canadians. Another curious point of difference concerning tuberculosis among the French-Canadians is that in Montreal the mortality is much greater among women than among men, 57 per cent of the total deaths having been of the female sex as against 43 of the male sex. But among all other nationalities, tuberculosis causes a higher mortality in the male sex.

*Canada—Tuberculosis mortality 1921 and 1922**

PROVINCES	POPULATION 1922	TUBERCULOSIS DEATHS		RATE PER 100,000	
		1921	1922	1921	1922
Saskatchewan	785,832	322	342	43	44
Alberta	611,281	314	312	53	51
Manitoba	626,436	420	376	69	60
Ontario	2,981,182	2,081	1,979	71	66
British Columbia	539,036	409	399	78	74
New Brunswick	392,381	413	418	106	107
Quebec	2,402,287	2,906	2,926	123	122
Prince Edward Island	88,307	128	112	143	127
Nova Scotia	528,207	702	695	134	132
Total	8,954,949	7,694	7,707	88	87

* From Bulletin Canadian Tuberculosis Association, Sept. 1923.

CEYLON

According to the 1921 census of Ceylon the total population is a little more than four millions and a half, with a density of 178 persons per square mile or practically the same as that of France. Ceylon is peopled mainly by the native Sinhalees, who number approximately three millions and make up 67 per cent of the entire population. There are, in addition, a million Tamiles, originally from India, and three hundred thousand Moors. Colombo, with a population of 244,163, is the main city. Predominantly rural conditons prevail in Ceylon, as only 13 per cent of the population is urban. The religion is mainly Buddhist and its adherents comprise 61 per cent of the total population. Hindus follow with 22 per cent, Mohammedans furnish 6 per cent and about 10 per cent are Christians. The general death rate in Ceylon is high. In 1920 it was 29.5 per thousand. In 1918, the influenza pandemic took 57,000 victims on this island alone. The general death rate varies greatly among the different racial groups. The highest, that of the Tamiles, was 38.5 per thousand in 1920. They were followed by the Malays with a mortality rate of 33 and by the Moors with 32.6. The Sinhalees, or indigenous, death rate was 28.5. Among the smaller group of Eurasians it was 22.9. Among the Europeans the death rate was only 13.3. The death rate of Ceylon in 1920 was 36.5 per thousand. Infant mortality is not as high as might be expected but still was 182 per thousand births during 1920. It is difficult to secure in Ceylon accurate statistics of mortality from all forms of tuberculosis. But for the more common type of acute pulmonary tuberculosis quite striking figures are available which show that even in that far-off part of the world, the recent trend of the disease has been along the lines noticed everywhere else, namely, a marked decline. In 1914 the death rate from acute pulmonary tuberculosis in Ceylon was 1.0 per thousand population (approximately 100 per hundred thousand). In 1915 and 1916 it was 0.9; from 1917 to 1919 inclusive, it fell to 0.8; and in 1920 was only 0.7. These figures indicate a fall in the phthisis mortality of approximately 30 per cent since 1914.

PORTO RICO

In Porto Rico, which now has a population of 1,346,600, there were 2,704 deaths from tuberculosis in 1922, or a mortality

rate from the various forms of that disease of 201 per 100,000. In 1921 the rate was 4 per cent lower, namely, 192.

SPAIN

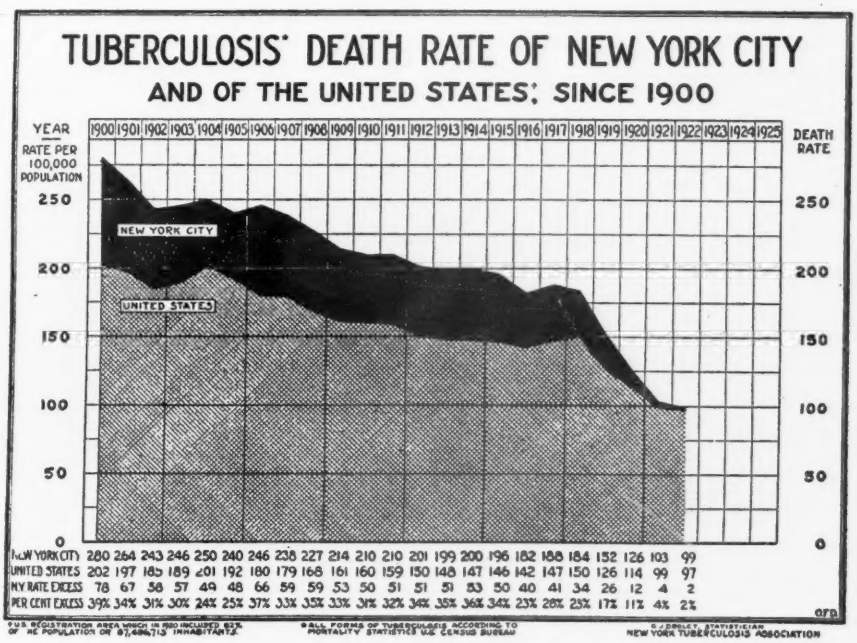
Spain, with a population of more than 21,000,000, had 37,513 deaths from tuberculosis in 1919. The death rate for all forms of tuberculosis in 1919 was 177 per 100,000 population, while that of the United States was 126 during the same year; but a rate of 365 per 100,000 population prevailed in the large cities, capitals of the Spanish provinces. While in the provincial or rural sections tuberculosis caused 8 per cent of all the deaths, in the cities the proportion was 12 per cent. Among the rural population in the Spanish provinces, exclusive of the capitals, the death rate from pulmonary tuberculosis was only 110 in 1919 and 30 for the nonpulmonary forms; but, in the capital cities, it was two and one-half times as high, being 293 for pulmonary tuberculosis and 72 for the surgical forms.

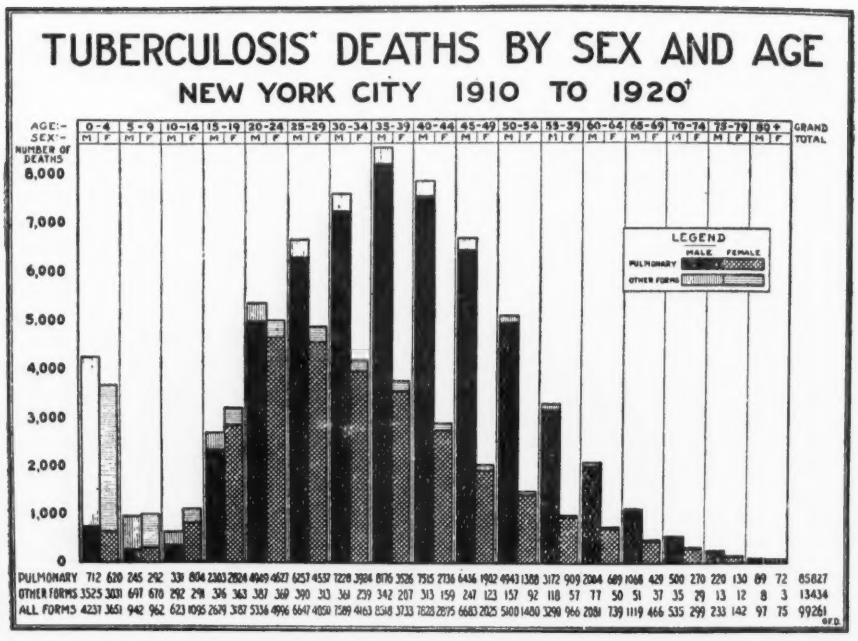
NEW ZEALAND

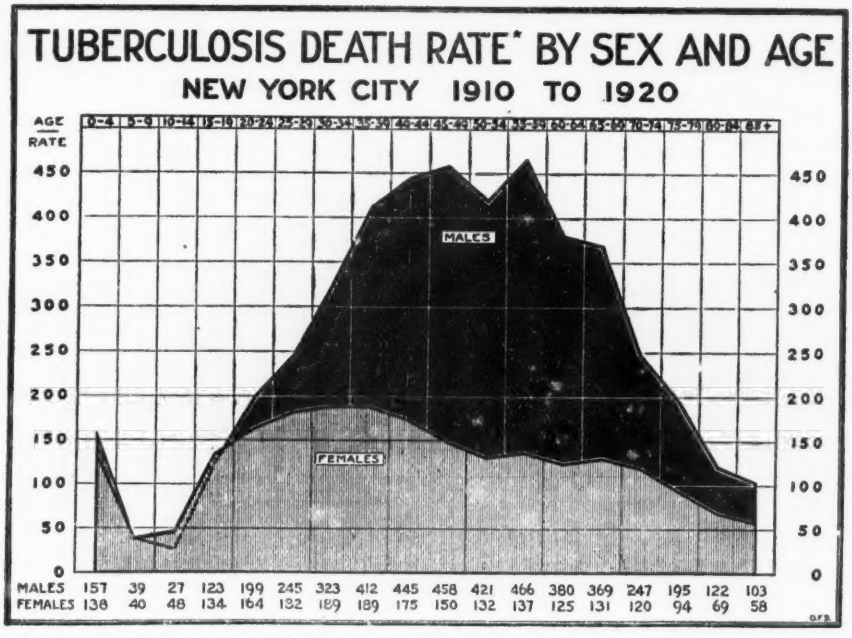
The tuberculosis death rate during 1922 was again lower than during the previous year, or 64 per 100,000 population. In 1921 it was 65. The decrease was entirely in deaths from the pulmonary type, the rate in 1922 from phthisis having been 50, whereas in 1921 it was 52.3. For tuberculosis of forms other than pulmonary a slight increase in the rate (from 12.5 in 1921 to 14.1 in 1922) was registered. The general mortality was again very low in New Zealand during 1922, the death rate from all causes having been only 8.77 per thousand. The birth rate has been decreasing slightly and was 23.17. The remarkable achievements in New Zealand against infant mortality have been more than maintained. The number of deaths of infants per thousand births in 1922 was only 41.9 or 14 per cent lower than the already low rate of 1921.

HAWAII

The tuberculosis death rate of Hawaii was 165 per 100,000 population in 1922. There were 450 deaths from various forms of tuberculosis among the 272,400 inhabitants of these islands.—*Tuberculosis in Foreign Lands. A Statistical Analysis and Review, G. J. Drolet, Bull. New York Tuberc. Ass., November–December, 1923, iv, no. 5, 13.*



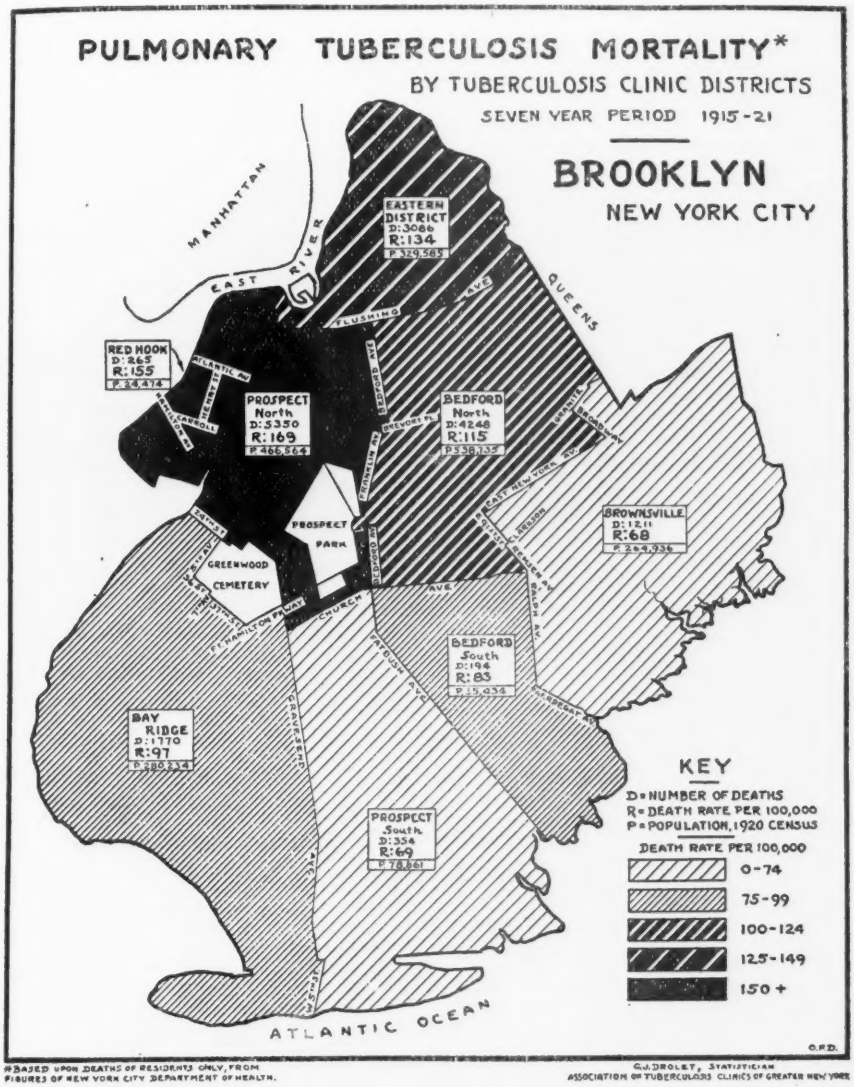




Compiled from statistics of the N.Y. Department of Health and the U.S. Census.

*Death rate from all forms of tuberculosis per 100,000 persons living at each specified age group during the ten-year period 1910 to 1919, inclusive.

G.J. Drolet, Statistician, Research Service, New York Tuberculosis Association.



Life Expectation for Males Increasing More than for Females.—In 1920 and 1921 the death rate of white females insured in the Industrial Department of the Metropolitan Life Insurance Company was higher than the rate for white males. Since the publication of these figures in May, 1923, the Company has had computed a life table showing by color and sex the comparative expectations of life during the two-year period 1911–1912 and for the year 1922. During this time the life expectancy of white females at age 10 increased only 3.8 years, or 7.5 per cent, while that of white males increased 6.28 years, or 13.8 per cent. In the colored group at the same age the margin in favor of the males was also appreciable, showing an increase in life expectancy for negro males of 5.42 years as compared with one of 4.77 years for negro females. Similarly, at the age divisions of 20, 30, 40 and 50 years, and at the higher

ages, for both colored and white persons, the life expectation of males has been increasing at a higher rate than for females. These figures relate to an important group of the population, namely, the wage-earners and wage-earners' families in American and Canadian cities. The life table is based on more than fourteen and one-half millions of lives, and the results are accurate and significant for this group of the population. Whether or not the greater record of improvement obtains among males in the general population cannot be determined positively until the mortality figures for the whole country become available. Past experience, however, has demonstrated the value of these insurance figures as indices of what takes place in the general population.—*Life Expectation of Males Increasing at a Greater Rate Than for Females, Statistical Bulletin, Metropolitan Life Insurance Co., October, 1923, iv, no. 10, 7.*

Research in State Sanatoria.—Sanatoria, because of intimate contact with patients, afford the best means of studying tuberculosis and its problem. The arguments put forward against tuberculosis research in state sanatoria are readily answered. The time and expense incurred in this work are well repaid, and everything should be done to encourage it.—*Tuberculosis Research in State Tuberculosis Sanatoria, S. J. Maher, Boston M. & S. J., November 29, 1923, clxxxix, 853.*

Decrease in Tuberculosis Mortality in 1923 among Insurance Policy-holders.—The decline during the past twenty years in the tuberculosis death rate is without parallel as an accomplishment in public health history. It is still going on. The 1923 figure of 110.2 per 100,000 represents a decline of 3.5 per cent since 1922. There has been a continuous fall in the mortality since 1918, when a rate of 189.0 was recorded. Ten years ago the tuberculosis death rate (206.7) was nearly double the present figure; in 1911, it was more than double. The per cent reduction since 1922, it is true, is small, but the important item is that the downward swing of the tuberculosis death rate still continues. The decline of the tuberculosis death rate in 1923 was due, for the most part, to a fall of 3.6 per cent in the mortality of the white policyholders. The rate among the colored was practically unchanged. This is in direct contrast to what happened in 1922, when the decline from 1921 was due to the greater fall among the colored people. Among the whites the greatest decrease was recorded for the age period fifteen to twenty-four years; among the colored, the most significant decline was for the period of childhood. The tuberculosis death rate of colored policyholders at all ages in 1923 (224.4 per 100,000) was approximately three times that of the whites (84.1). The greatest contrast between the colored and white rates is found at the ages of childhood. Colored children in 1923 had a death rate more than eight times the rate for the whites.—*Nineteen Twenty-Three a Record Health Year, Statistical Bulletin, Metropolitan Life Insurance Co., January, 1924, v, no. 1, 1.*

Tuberculosis among Japanese Settlers in Manchuria.—Title only given.—*Tuberculosis among Japanese Settlers in Manchuria, H. Yanagiwara, Tokyo Igakkwai Zasshi, February, 1923, Title taken from Japan Medical World, August 15, 1923, iii, 195.*

Tuberculosis Mortality for United States during 1922.—The Department of Commerce announces that compilations made by the Bureau of the Census show that 90,452 deaths were due to tuberculosis in the registration area of the United States in 1922, with a death rate of 97 per 100,000 population. This is a drop of 2.4 since 1921, in which year the rate was 99.4 per 100,000 population. Though twelve states show increases in rates for 1922, in twenty-two states there are decreases, indicating that the general trend is still downward. To permit better interstate comparisons for the year 1922, adjusted rates based on the standard million population have been calculated. The highest adjusted rate from tuberculosis for 1922 is 172.6 per 100,000 population for Colorado and the lowest is 36.1 for the adjoining state of Nebraska. The high rate for Colorado should not be ascribed to unhealthfulness of climate, but rather to the fact that the climate attracts those afflicted with tuberculosis. For certain states adjusted rates have been calculated separately for the white and colored populations. In this group of states Tennessee has the highest adjusted rates for both white and colored (respectively, 121.8 and 299.8 per 100,000 population). The lowest adjusted rate from tuberculosis for white population is 54.5 for Mississippi, and this state and Florida each show the lowest rate for colored population (171.5 per 100,000 population).—*Mortality from Tuberculosis, United States Registration Area, 1922, U. S. Public Health Reports, December 21, 1923, xxxviii, 3034.*

Deaths and death rates from tuberculosis (all forms) in the registration area (exclusive of Hawaii) and in the registration States

AREA	NUMBER OF DEATHS			DEATH RATE PER 100,000 POPULATION					
				Adjusted,[1] 1922	Crude[2]				
	1922	1921	1920		1922	1921	1920	1919	1918
Registration area	90,452	88,135	99,916	(3)	97.0	99.4	114.2	125.6	150.0
Registration States (including District of Columbia) of 1918	81,722	81,986	93,170	(3)	97.4	99.0	114.0	124.9	148.8
California	5,881	5,422	5,555	144.5	159.1	151.1	159.6	175.3	186.7
Colorado	1,789	1,775	2,134	172.6	183.3	184.6	225.4	215.1	242.9
Connecticut	1,358	1,364	1,666	90.6	93.7	95.9	119.4	126.5	153.9
Delaware	273	318	327	115.9	119.6	140.5	146.0	163.6	(4)
Florida (total)	1,032	959	1,021	101.4	100.8	95.7	104.1	104.8	(4)
White	446	417	435	64.3	64.8	62.4	67.1	74.9	(4)
Colored	586	542	586	171.5	174.5	162.5	176.8	161.6	(4)
Georgia (total)	2,613	(4)	(4)	(3)	88.0	(4)	(4)	(4)	(4)
White	963	(4)	(4)	(3)	54.9	(4)	(4)	(4)	(4)
Colored	1,650	(4)	(4)	(3)	135.9	(4)	(4)	(4)	(4)
Idaho	202	(4)	(4)	(3)	44.0	(4)	(4)	(4)	(4)
Illinois	5,620	5,617	6,568	80.1	83.8	84.8	100.6	114.9	135.7
Indiana	2,619	2,752	3,201	84.6	87.6	92.9	108.8	114.1	140.2
Kansas	786	772	855	42.9	43.9	43.3	48.2	36.3	59.8
Kentucky (total)	3,253	3,197	3,705	138.3	132.8	131.2	152.9	165.3	199.0
White	2,567	2,424	2,851	121.6	115.6	109.9	130.3	143.1	169.3
Colored	686	773	854	292.7	299.0	333.1	363.8	367.8	466.0
Louisiana (total)	2,198	2,228	2,550	125.7	119.8	122.4	141.2	143.9	185.8
White	789	778	894	73.7	69.4	69.5	80.9	80.8	109.0
Colored	1,409	1,450	1,656	208.0	201.7	207.2	236.2	241.7	302.9
Maine	654	634	799	81.2	84.4	82.2	103.8	103.4	121.4
Maryland (total)	1,939	2,997	2,139	127.2	130.2	135.5	146.7	165.8	207.6
White	1,255	1,252	1,337	96.9	101.1	102.1	110.4	129.4	163.1
Colored	684	745	802	273.7	275.7	301.8	326.6	344.2	423.4
Massachusetts	3,732	3,870	4,412	90.0	93.8	98.6	113.8	128.0	159.0
Michigan	2,644	2,755	3,101	66.5	68.0	72.5	83.6	85.7	101.5
Minnesota	1,714	1,875	2,151	68.0	69.5	77.0	89.5	94.7	104.6
Mississippi (total)	1,924	1,989	2,287	116.4	107.4	111.1	127.8	136.0	(4)
White	413	423	410	54.5	48.4	49.5	47.8	57.2	(4)
Colored	1,511	1,566	1,877	171.5	161.3	167.2	201.2	207.1	(4)
Missouri	3,258	3,182	3,644	90.7	94.9	93.1	106.9	117.2	144.4
Montana	383	356	419	59.0	64.5	61.8	75.1	88.9	96.8
Nebraska	483	487	561	36.1	36.5	37.0	43.0	(4)	(4)
New Hampshire	398	351	430	86.8	89.2	78.9	97.0	102.5	126.1
New Jersey	3,148	3,043	3,635	91.2	95.0	93.6	114.0	127.4	157.4
New York	10,695	10,836	12,634	93.8	99.8	102.4	120.9	140.9	167.9
North Carolina (total)	2,716	2,739	3,004	115.1	102.5	104.8	116.5	122.4	138.7
White	1,318	1,266	1,491	79.7	71.0	69.3	82.8	86.0	94.7
Colored	1,398	1,473	1,513	198.5	176.2	187.4	194.2	205.9	238.8

Deaths and death rates from tuberculosis (all forms) in the registration area (exclusive of Hawaii) and in the registration States—Continued

AREA	NUMBER OF DEATHS			DEATH RATE FOR 100,000 POPULATION					
				Adjusted, 1922	Crude				
	1922	1921	1920		1922	1921	1920	1919	1918
Ohio	5,159	5,270	5,975	81.8	85.8	89.1	102.8	114.6	136.2
Oregon	581	608	703	68.6	71.6	76.0	89.1	90.6	88.1
Pennsylvania	8,018	8,197	9,213	87.7	89.2	92.3	105.0	119.1	151.6
Rhode Island	588	663	798	91.5	94.8	108.0	131.3	148.8	181.5
South Carolina (total)	1,891	1,901	2,031	123.0	109.5	111.2	120.0	135.6	144.5
White	425	440	540	55.1	49.7	52.4	65.5	68.0	67.9
Colored	1,466	1,461	1,491	192.1	168.0	168.0	172.0	199.0	215.4
Tennessee (total)	3,520	3,304	3,860	157.1	148.1	139.9	164.6	169.0	206.8
White	2,195	2,039	2,451	121.8	113.7	106.6	129.3	126.6	151.5
Colored	1,325	1,265	1,409	299.8	296.8	282.0	312.6	344.9	432.5
Utah	194	184	177	42.9	41.4	39.9	39.1	44.8	47.8
Vermont	326	245	288	87.8	92.5	69.5	81.8	91.0	104.5
Virginia (total)	3,092	3,131	3,319	137.5	130.3	133.4	142.9	150.1	186.6
White	1,457	1,423	1,545	91.4	86.9	86.1	94.8	97.5	126.1
Colored	1,635	1,708	1,774	246.6	234.8	245.9	256.2	272.0	315.9
Washington	1,104	1,150	1,346	75.0	78.2	82.7	98.4	103.0	103.6
Wisconsin	1,928	2,014	2,267	70.0	71.2	75.1	85.6	84.1	94.4
Wyoming	86	(4)	(4)	(3)	41.6	(4)	(4)	(4)	(4)

[1] The adjusted rate makes allowance for the differences in the age and sex composition of the populations in the different States and shows what the death rate would be if all States had the same proportion of males and females and the same proportion of the total population in each age group.

[2] The crude rate is based on total population and all deaths occurring within the given area.

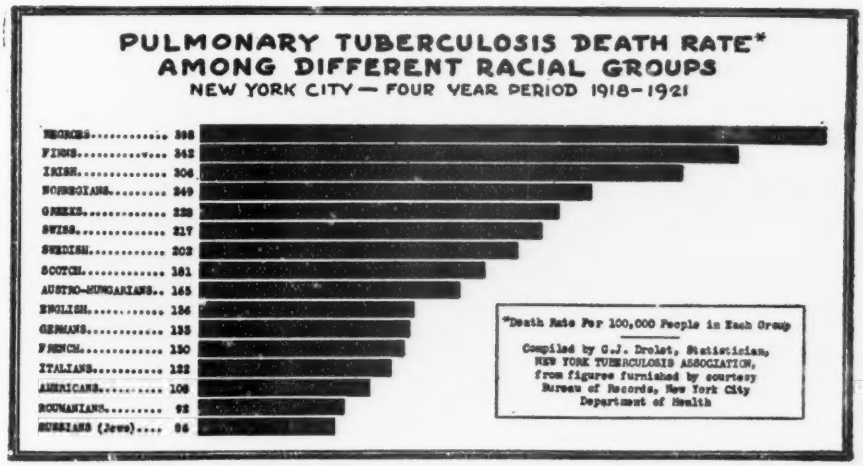
[3] Rate not computed.

[4] Not added to registration area until a later date.

Life-Span of Insured Wage-Earners during 1922.—The slightly higher mortality rate of the year 1922 did not affect appreciably the expectation of life among insured wage-earners. In 1921 the expected life-span at birth was 55.08 years, that is, infants born in 1921 had a prospect of living that number of years if the mortality conditions prevailing during the year were to continue throughout life until the last of that cohort of children passed from observation. In 1922 the average lifetime was calculated to be 55.04 years, a figure inappreciably different from that which was observed in 1921. The effects of the influenza and pneumonia epidemics in the early part of 1922 were evidently offset by other and more favorable developments in health conditions during the rest of the year. Compared with the expectation of life prevailing in 1911–1912 (46.63) the year 1922 shows a gain of 8.41 years; and, as compared with 1919–1920, a gain of 3.90 years. An increase of nearly eight and one-half years in the life-span within eleven or twelve calendar years is a remarkable achievement, perhaps unequalled in the records of any other population group in any similar period of time in public health history. The death rate among insured wage-earners has been declining more rapidly than in general population groups, and consequently, the wage-earner's longevity has improved at a more rapid pace than for the whole population. There is no better index of the improved well being of the industrial classes than these gains in the life-span.—*The Life-Span of Insured Wage-Earners during 1922, Statistical Bulletin, Metropolitan Life Insurance Co., August, 1923, iv, no. 8, 2.*

Tuberculosis Problem To-Day.—Tuberculosis has always presented problems in diagnosis because it is an infection frequently overlooked on account of its insidious onset, the variety of its manifestations, especially its presence in other tissues than the lungs, and its duration. Yet the essential course remains the same. The bacillus may enter the body at any point and after entrance is colonized in various tissues, but it comes by passage from a previously infected man or animal. The outcome may be progressive disease or internment or destruction of the bacillus with the establishment of more or less immunity. Despite the ubiquity of the bacillus and the universality of infection, less than ten per cent of all deaths in England and Wales in 1920 were from tuberculosis. Many symptoms of ill health and disturbed growth in childhood are due to a lurking tuberculous infection, and periodic tests of children should be made to head off some of the later clinical tuberculosis. Early detection of the disease is of paramount importance. Prevention of infection cannot be accomplished, but results of infection can be countered in large part by anticipatory detuberculization, which consists in tuberculin treatment for months of infected but not necessarily sick children. The present sufferers should be cared for and all possible contacts followed up. Any scheme for adequately meeting the issue should include a tuberculosis dispensary to diagnose and, through its "care committee," attend to economic matters of poor families which suffer the economic consequences of the disease. This care should be continuous. The scheme should include sanatoria for treatment of *early* cases and hospitals for advanced cases; it should maintain working colonies, for arrested cases, and open air schools. The *Tuberculosis Scheme* coördinates all these agencies. Progress is being made with the tuberculosis scheme in the face of difficulties, but there is great need for voluntary effort, money for research, training of doctors in tuberculosis (the study of tuberculosis has recently become compulsory in the University of Edinburgh), milk supply control and better provision for immediate treatment of the sick. Results of the campaign in the British Isles are gratifying. There has been an appreciable decline in the death rate, much more accelerated in the very recent years, and this decline is greater than that from other diseases in the same period of time.—*The Actual Position of the Tuberculosis Problem Today, R. Philip, An address . . . . at the Conference of the National Association for the Prevention of Tuberculosis at Birmingham, July, 1923, pp. 36.*

Control of Tuberculosis.—If best results are to be had in the campaign against tuberculosis, attention should be paid to numerous important matters, such as careful reporting of the disease and complete dispensary facilities, with attention to diagnosis, types of treatment in given cases, "after care," dispensing of information, examination of contacts, etc. In such a program financial relief for the family of the tuberculous breadwinner and nursing attention to the sick outside sanatoria are necessary. The family of the sick should receive more attention, for there are probably 20,000 contacts in the average city of 750,000 people.



Attention to the milk supply is also important.—*Co-ordination of Measures for the Control of Tuberculosis of the Lungs, E. W. Hope, J. State Med., November, 1923, xxxi, 529.*

Control of Pulmonary Tuberculosis.—The measures which aim at the control of pulmonary tuberculosis relate not only to the measurement of the disease but to the prevention of its development and to the control of infection. The coördination of effort, which has the twofold aim of prevention and treatment, will always present definite difficulties. A discussion of the problem from the viewpoint of the author, who is an English County Medical Health and Tuberculosis Officer, is given, and the following points are emphasized: 1. The necessity for an improved system of notification. 2. The importance of routine sputum examinations, both for diagnosis and to determine the location of open cases. 3. The importance of hospitalization of acute and advanced cases to control infection. 4. The necessity for higher standards of treatment and for a closer coöperation between the tuberculosis officer and the medical practitioner. 5. The importance of early diagnosis in relation to treatment. 6. The necessity for a far seeing and progressive housing policy. 7. The need for instruction in domestic science, hygiene and food values. 8. The desirability of establishing a guiding central body or council.—*The Coördination of Measures for the Control of Pulmonary Tuberculosis, H. H. Thomson, Tubercle, January, 1924, v, 167.*

Duty of Physicians in Management of Tuberculosis.—A great improvement in the reporting of cases of tuberculosis is necessary. Reports are now not made because of (1) antipathy of physicians to the new ruling from ethical reasons and (2) impossibility of enforcing the ruling. Reports of morbidity should be made as early as possible by sputum examination, etc., and by following up contact cases. Enforcement of hygienic measures should be carried out wherever necessary. Uniform treatment is necessary and can be had by coöperation between physicians and the public health organization. The physician should order the protective measures necessary in given cases and see to their execution, and should see to the disinfection of sputum, laundry, etc., of the sick, and to the isolation of the sick and ultimately of the healthy, and he should work through the public health physician. He should give the exact diagnosis upon the death certificate, superintend the final disinfection and look after the health of the exposed relatives of the dead person.—*Die Aufgaben der praktischen Ärzte bei dem heutigen Stande der Tuberkulosefürsorge, Engelsmann, Klin. Wchnschr., September 17, 1923, ii, 1765.*

Tuberculosis Work in England.—The progressive interest of the state in tuberculosis is shown by the different scientific investigations and royal commissions. In 1865 the Privy Council enlisted the aid of Sir John Burdon-Sanderson in carrying out experiments which confirmed those of Villemin on the transmissibility of tuberculosis. Before and after Koch's discovery of the tubercle bacillus research work was carried out by Klein and others with the assistance of scientific grants from the Local Government Board. Sir George Buchanan reported his investigation on soil dampness as a cause of tuberculosis. The results obtained were confirmed by Bowditch in America. In 1888 the Departmental Committee was appointed to consider, among other matters, the best method of dealing with tuberculosis, with a view to checking the disease in cattle. A Royal Commission investigated the effect of food derived from tuberculous animals on human health. In 1895 it reported the conclusions as to the effect of the consumption of tuberculous milk on human health. To investigate this question further another Royal Commission was appointed and its findings received legislative recognition in the Dairies, Cowsheds and Milkshops Order of 1899. In 1901 a Royal Commission was appointed to investigate Koch's statement made at the Tuberculosis Congress in London, that "human tuberculosis differs in important respects from bovine tuberculosis and cannot be transmitted to cattle." The commission worked for ten years and published its valued series of reports, which indicated that Koch's statements could not be accepted in their entirety, that human tubercle bacilli can infect cattle under experimental conditions, while bovine bacilli are responsible for a considerable proportion of human tuberculosis, especially among children. In 1902 the Local Government Board had the sanatorium question investigated. In 1907 the establishment of the School Medical Service by the Board of Education had an important bearing on the prevention and treatment of tuberculosis in the child. The labors of this service have already secured a great reduction in the incidence of tuberculosis in children of school age. In Scotland pulmonary tuberculosis has been a notifiable disease since 1897. In 1912 compulsory notification of all forms of tuberculosis was introduced in England and

Wales. The passing of the National Insurance Act in 1911 provided for the treatment of insured patients. In 1912 the Hobhouse Act made free treatment available for non-insured as well as the insured. The tuberculosis scheme approved by the Local Government Board provided for: (1) the medical officer of health of a county council or county borough as chief administrative officer; (2) tuberculosis medical officers appointed by the local authorities; (3) dispensaries (including a system of health visiting); (4) sanatoria for early cases; and (5) hospitals for intermediate and advanced cases. Insured patients could be put on domiciliary treatment; that is, they could be treated in their own homes by the panel medical practitioner. The war unfortunately obstructed the carrying out of this scheme. The Ministry of Pensions bears the cost of the entire treatment of tuberculous ex-soldiers, of whom there were 35,000. It also provided vocational training for these men. The central Fund for the Industrial Welfare of Tuberculous Persons provides work for men who have received training but whose rate of production is too slow for the open market. These men live in their own homes in London and attend a workshop daily. It is hoped that they will eventually be able to support themselves in the suburbs under favorable circumstances on orders supplied by the Central Trading Organization. At the present time in England a tuberculosis scheme is being carried out in 442 dispensaries by 349 tuberculosis officers. There are 441 institutions and 19,386 beds. The state is kept informed of any advances in medical progress in tuberculosis and is prepared to assist local authorities in putting them at the service of the community as soon as they are justified by medical science. There are a number of training colonies and village settlements established for those with recently or partially healed lesions. The total public expenditure by the Exchequer and local authorities upon tuberculosis schemes is more than 2.5 million pounds annually. The value of general public health measures and special antituberculosis work on the declining mortality rate from tuberculosis is shown in the Registrar-General's report (1919): "The deaths assigned to tuberculous affections in the aggregate for the period 1901–1910 numbered 565,161, being fewer by 50,845 than the number in the preceding decennium. Corrected for estimated increase in population the difference becomes 121,941. The statement of the number of lives saved is further increased when allowance is made for the fact that the constitution of the population in 1901–1910 was more favorable to tubercle mortality than was that of the population in 1891–1900. The standardized death rate in 1901–1910 was 1,046 per million living, showing a reduction of 18.6 per cent from the corresponding rate in the preceding decennium. On this basis the reduction in the number of deaths from what might have been expected if no further fall in mortality has occurred amounts to 128,758." During the interval of fifty years preceding 1910 mortality from tuberculosis has been nearly halved among males and more than halved among females. The period, 1860–1910, of lowered mortality from tuberculosis is associated with a certain degree of institutional segregation of the consumptive and with education of the consumptive in measures of precaution against dissemination of the disease. The foundation stones of a campaign against tuberculosis were being laid, and measures of this kind had a certain share, at all events, in effecting a reduction in incidence of the disease. Again, the same period embraces wide measures of public health and social reform. Better sanitation, better housing, higher wages, more abundant food supply, cheaper bread, better industrial conditions and coördinated public health measures prevailed. To this realization of the responsibilities of the community toward improving the standard of health, in general, and toward the care of tuberculous persons, may fairly be ascribed the remarkable fall in the death rate witnessed in the latter part of the nineteenth and first decade of the present century. The death rate from respiratory tuberculosis in 1847 was 3,189 per million, and in 1922 it was 855. In the past two years the death rate has fallen more rapidly than in any previous similar period of which we have a record. The day may not be seen when tuberculosis is as rare in England as leprosy, but its ultimate attainment may be looked forward to with some degree of hope.—*Tuberculosis Work in England, A. S. MacNalty, Lancet, January 26, 1924, ccvi, 165.*

Control of Tuberculosis in Impoverished Country (Germany).—The new Prussian laws too strongly emphasize infection with the bacillus and neglect the immunity upon which tuberculous disease is more dependent. Housing, the price of coal with taxation, and the political taxes are considered. The years of specific treatment may act in diminishing the number of tuberculous activations.—*Über die Methoden der Tuberkulosebekämpfung, die in einen armen Lande möglich sind, A. Wolff-Eisner, Ztschr. f. Tuberk., January, 1923, xxxvii, 343.*

Plan for Prussian Tuberculosis Laws.—A tuberculosis law is essential but it should be national. Reporting of all open and closed cases of tuberculosis is necessary, especially of those that may be reasonably expected to develop into open cases. Wherever a sanatorium exists all tuberculous and suspect tuberculous individuals should be registered. The registration should be with a court physician and be given then to a sanatorium. Court physician and sanatorium should coöperate. The local physician should refer the case to the sanatorium determined by the court physician. Death from any form of tuberculosis should be reported. Tuberculosis courses of three years' duration are recommended for schools. The sanatorium should have representation on housing commissions. Children should be protected and removed from household-infection sources, and like action might be worth while for adults. Stringent laws in the interest of tuberculosis combat are not to be feared, if properly applied.—*Zum Entwurf des preussischen Tuberkulosegesetzes, H. Braeuning, Ztschr. f. Tuberk., January, 1923, xxxvii, 354.*

Anthropometry and Human Constitution in Relation to Disease.—Constitution may be regarded as that aggregate of hereditarial characters, influenced more or less by environment, which determines the individual's reaction to his environment. Four main categories or "panels" may be mentioned: morphology, physiology, psychology and immunity. The authors believe with Hunter, Addison, Laycock, and Hutchinson, that this habitus or physical form of the individual bears an important relationship to disease. Also, physical features express in the morphology panel certain basic hereditarial influences. The complete anthropometric technique of physical anthropology has been generally neglected by students of clinical medicine. But warrant is found for believing that people with similar potentialities possess other remarkable and similar hereditarial characteristics. The technique of anthropometry, recording and analysis of data used here is based largely on the work of well known anthropologists, such as Hrdlička, certain modifications being made to apply to the measurements of severely ill patients. In this study 50 patients with gall bladder disease and 39 with gastric or duodenal ulcer are included, the diagnosis in all cases being proved at operation. The following facts were clearly brought out: 1. The far higher ponderal index of the gall bladder people. 2. Their wider subcostal angle. 3. The closer approach to a right angle of their gonial angle. 4. Their far greater chest depth. 5. The wider and squarer front of the upper jaw of the gall bladder people, and their shorter, broader and stockier teeth, set vertically or in lingual version, the lateral incisors almost as broad as the central and frequently somewhat worn on the biting edge. In borderline cases a consideration of the net tendency of the anthropometric findings will lead to a correct diagnosis in 90 per cent of cases. Another point of interest is the extreme accuracy with which the human eye detects slight differences of morphology. It is contemplated to make more complete and comprehensive studies of habitus in relation to disease by the anthropometric method.—*Studies in Human Constitution. I. Clinical Anthropometry, G. Draper, H. LeDunn and D. Seegal, J. Am. M. Ass., February 9, 1924, lxxxii, 431.*

Physical Types in Adolescent Tuberculosis.—Anatomic characteristics in those suffering from pulmonary tuberculosis have attracted the attention of many observers. Imaginative writers have often touched upon the consumptive, and many, such as Sterne, Keats, Stevenson, Kirk White and possibly Poe, certainly Charlotte Bronté, illustrated these facts of physique in their own persons. Galton and Mahomed were unable to find an average face for the tuberculous. They, however, compare the overbred in animals to the extreme group of fine-faced phthisicals. They aver that the "precocious child" lacks staying power. It seems to Woodcock that frequently the adolescent patient with phthisis has inherited his characteristics from one parent only, even in an accentuated form. This is not incompatible with the scientific theory of inheritance. Against the hypothesis that certain so called phthisical stigmata are themselves due to the progress of the disease is the fact that many people with such stigmata go through life in perfect health. The type of child with the beautiful hard palate, palisade teeth, with no exuberance of lymphoid tissue, is seen in ordinary social life. The health of these children is generally good and their mentality high—they are noticeable children. One can divide late childhood tuberculosis into surgical and medical, and the physical types differ widely. The introspective child with pulmonary disease, with adult countenance and Charlotte Bronté facial expression, is found in the medical ward, while in the surgical are seen only short-faced, round-faced, cheerful children. The fine type of tuberculous adolescents are physically beautiful and succumb readily. They are not necessarily under weight, nor are their chests malformed. The limbs are long, joints loose,

the hands long and slender. The skin is generally delicate and covered with a fine downy hair. The teeth are perfect in form, but fragile. In these patients tubercle strikes at the lung and larynx, and advances rapidly. In cases treated by artificial pneumothorax, the tendency to fibrosis is lacking; there is rapid lung destruction by ulceration, and the disease soon becomes grossly bilateral. Under the best conditions these individuals may flourish; under the worst they quickly succumb, for they are peculiarly temperamental Utopians, of the artistic type. The frequent observation of similar characters in one parent only shows the necessity for a closer study of the Mendelian theory, with the effects of environment and overstrain. There is much collecting of clinical details to be done.—*Adolescent and Other Forms of Tubercle, H. de C. Woodcock, Tubercle, November, 1923, v, 64.*

Heredity in Pulmonary Tuberculosis.—The statistics (see also München. med. Wchnschr., 1911, No. 38) concern 2978 nonafflicted and 1482 afflicted persons of pulmonary tuberculosis parentage and 6678 nonafflicted and 1182 afflicted persons of healthy parentage. Among sisters and brothers there were 4800 of the nonafflicted without parental tuberculosis and 600 with parental tuberculosis, and 3000 consumptives without and 1500 with parental tuberculosis. Among one-third of the consumptives and among a larger percentage of the women the history revealed parental tuberculosis; among less than one-sixth this was true of the nonconsumptives. Among afflicted families there were more than double, and when both parents were afflicted, four times as many consumptives during the course of ten years than among the nonafflicted. An increased incidence of phthisis among the offspring of consumptives is therefore verified. In 1921 (after 20 years) there were still 2617 consumptives classed as favorable and able to work. Of these 1720 were arrested and 897 still active. As a whole, the consumptives of tuberculous parentage were not less resistant than those with healthy parents, and there was no decreased resistance when both parents were phthisical. There is no hereditary constitutional disposition to pulmonary tuberculosis. Naturally the exposure to infection in tuberculous families is greater.—*Die Heredität bei Phthisis pulmonum, F. Reiche, Beitr. z. Klin. d. Tuberk., March, 1923, liv, 394.*

Scrofula and Heredity.—In the health resort, Gleichenberg, disease pictures were observed which are typical of patients from Galicia. These patients have lived for centuries under miserable economic conditions. Their diseases affect the upper respiratory passages. The histories showed that they have been inherited from the grandparents and parents. As tuberculosis is present mostly in the less accentuated grades, it has, in spite of the malnutrition of the majority of these Galicians, no longer been able to reach the more severe grades in general. The toxin has become anchored at the site of absorption, especially in the lymph nodes and underneath the skin, where it has b come arrested and attached, to remain subsequently as a scrofulous structure. The scrofulous habitus persisted even in those patients who were in better conditon later. Scrofula may be external or internal, visible or manifest, and invisible. The following case illustrates the latter variety: A hereditary scrofulous child, in spite of the most favorable conditions of life, becomes affected with a phlyctenular, that is, scrofulous conjunctivitis after several iodine baths especially in damp weather. These people, the Galicians, have repeatedly been infected with syphilis. The virus has persisted through centuries and becomes associated with typical degenerative forms, such as tabes dorsalis, multiple sclerosis, spastic paralysis, Friedreich's disease, syringomyelia, and central asthmatic diseases. Scrofula in patients manifesting these hereditary nervous diseases is the result of tuberculosis and syphilis. The hereditary element is shown in two familial pictures: (1) The grandmother showed scrofulous lymph nodes and a severe trigeminal neuralgia; the daughter and the grandchild were affected with a nervous urticaria. (2) The grandfather had lupus of the pharyngeal mucosa; the son showed a tuberculous hemoptysis and the grandchildren were affected with scrofula and splenomegaly.—*Some Remarks on Hereditary Phenomena with Special Reference to Scrofula and its Relationships to Endocrinology, L. H. Werdisheim, N. York M. J. & Med. Rec., January 2, 1924, cxix, 21.*

Tuberculosis Allergy and Pertussis.—The diminution of allergy to tuberculosis in children proved to be tuberculous is a serious menace to such children when they develop pertussis. The lighting up of a tuberculous process by an attack of whooping cough is thus seen to be a very real thing, and one necessitating frequent examination for tuberculous manifestations. Preëxisting tuberculosis is obviously an added indication for careful treatment of cases of whooping cough.—*Allergia tubercolinica e pertosse, P. Galli, Pediatria, October 15, 1923, xxxi, 1091.*

Influenza and Tuberculosis.—It is common to find tuberculosis diagnosed as influenza and the reverse is not rare. Influenza can also be followed by tuberculosis. The differential diagnosis is not easy, since the physical findings do not clearly differentiate these conditions. Repeated observations and exact study frequently lead to a differentiation; sputum examinations frequently aid the diagnosis and roentgen examination is valuable. Likewise, the constitution of the patient may be of significance; *status thymicolymphaticus* and *habitus irritabilis Borchard* predispose to influenza. The observation of others is verified that with an existing pulmonary tuberculosis, that is not too far advanced, an intercurrent influenza may not exert an unfavorable influence on the tuberculosis. Lymphatic tuberculosis seems to be unfavorably affected by influenza, the tendency being toward a miliary dissemination during influenza. The cause of death in these cases is the influenza. —*Grippe und Tuberkulose, L. Petschacher, Beitr. z. Klin. d. Tuberk., March, 1923, liv, 372.*

Milk and Tuberculosis.—Of 1,215 English and Scottish cases 23 per cent were bovine in origin. Of deaths from tuberculosis in these countries every year, 6.44 per cent, or about 3,000, are due to the bovine bacillus. About 7 per cent of the milk on sale contains virulent bovine tubercle bacilli. It is important to recognize tuberculosis in the cow by physical examination and especially by tuberculin test. Killing of all tuberculous cattle is ill-advised. A recent law makes it illegal to sell milk knowingly from a tuberculous cow and provides for the issuing of licenses to dairymen who are able to classify their milk as *Certified, Grade A, and Pasteurized.* Specifications must be met before the word *Pasteurized* is allowed to be used as a label for milk. If the people demand it now, they may get milk entirely free from living bovine tubercle bacilli.—*Milk and Tuberculosis, W. Buckley, J. State Med., January, 1924, xxxii, 25.*

Pregnancy and Tuberculosis.—Among 102 women with prior pulmonary disease there were 96 in whom the delivery was inconsequential, in 4 there occurred a slight febrile reaction and in 2 there developed marked catarrhal and febrile reactions. Since interruption of pregnancy has its dangers also, such a result is important in guiding action. With every additional month of pregnancy the dangers increase and interruption in the second half of pregnancy is a serious procedure. Apical changes must be seriously weighed on the basis of the general bodily condition. Caution must be exercised in making roentgenographs. As indications should be considered the tuberculous children already born, the number of living children, and tuberculosis in the father. Up to the twelfth week the curette can be used. It is best to use iodoform-glycerine gauze, especially about the fourth month. After the fifth month interruption is not to be recommended unless vitally indicated. Interruption after the thirty-second week of pregnancy is more serious than spontaneous birth. Lumbar anesthesia is preferred. If a general anesthetic must be used only chloroform is to be considered. Abdominal incisions are never to be recommended, since they make expectoration more difficult and any coughing tends to cause hernias. In young women the ovaries must be spared under all circumstances. Extirpation of the uterus quickly improves the case, since it abolishes menstruation and also the fear of conception. Roentgen-ray sterilization is not absolutely reliable. In the majority of consumptives pregnancy and birth and delivery do not influence the general condition. Sanatoria should be open to pregnancy cases. Frequent pregnancies are harmful to the tuberculous process. In a definite percentage, interruption of pregnancy has harmful consequences; infections, even with the most careful procedures, cannot be avoided. Weakness may follow the narcosis or loss of blood. Important is the prophylaxis of pregnancy, but definite rules should be outlined. Of 6 manifest Turban I cases 3 became worse during nursing, of 3 in stage II there were 2 who became worse, and 1 in stage III. Of 10 "latent-active" 7 became worse and 3 remained stationary. Nursing is therefore dangerous for all actively tuberculous women. Of the "healed latent inactive" 27 per cent became worse, while 73 per cent remained well. The decision to nurse should be left to the women but the dangers explained. General rules for interruption of pregnancy or conservative treatment, sterilization, whom to permit to nurse their children, etc., cannot be laid down. Each case should be considered individually. —*Schwangerschaft und Tuberkulose. Eine gynäkologisch-konsultative Studie, P. Strassmann, Beitr. z. Klin. d. Tuberk., December, 1922, liii, 353.*

Types and Etiology of Tuberculosis.—The III stage of Ranke is simplified to the following II-stage scheme: 1. Primary complex. 2. General disease: (a) meningitis and miliary tuberculosis; (b) localized general disease: (i) glandular, bone and joint tuberculosis; (ii) pulmonary tuberculosis. At the beginning of childhood the body possesses

no protective substances; these are formed later. Bacilli sealed in calcified lesions can live for years. If the disease is not arrested in the regional lymph nodes then general disease develops. Aerogenic infection of the apices is denied because only forced respiration causes air to enter there. Hematogenous infection is favored by anatomic factors, such as vascular distribution and slowing of the circulation. General disease can be a flare-up of an old lesion but can also occur from an exogenous reinfection or superinfection, since the body cannot resist all virulent strains of bacilli. An absolute immunity to tuberculosis does not exist. A single Friedmann inoculation cannot protect infants against infection.—*Betrachtungen über einige Tuberkulosefragen, H. Rieckenberg, Ztschr. f. Tuberk., March, 1923, xxxvii, 430.*

Development of Tuberculous Infection.—Title only given.—*On a New View on the Development of Tuberculous Infection, A. Sata, Kekkaku Zasshi, March, 1923, i, Title from Japan Medical World, December, 1923, iii, 274.*

Avenues of Tuberculous Infection.—The question of the routes of pulmonary infection is not satisfactorily solved. Even the Flügge droplet infection leaves much to be desired, especially in explaining alveolar infection. It is questioned whether the moist droplets are not removed by the moist mucous membranes of the upper air passages and the slowing of the air current toward the alveoli. Behring was inclined to the view that all infection was by way of the mouth and digestive tract and especially from cow's milk. J. Koch and Moeller, by oral infection in rabbits, were able to obtain an isolated, upper-lobe, chronic pulmonary tuberculosis resembling that seen in man. Guinea pigs and rabbits were infected *per os* to determine how frequently pulmonary infection occurred by this method. By dropping the bacilli into the mouth a typical glandular and pulmonary tuberculosis was produced. The glandular disease resembled human scrofulosis. A part of the bacilli given by mouth are taken up by the mucous membranes of the upper digestive tract, the absorption being along the lymphatics, the bacilli then entering with the lymph the *ductus cervicalis* and thence into the blood stream, into the right heart and the lung. They cannot enter the tracheobronchial nodes from the neck glands, since there is no connection between these two groups. It is believed that human scrofulosis can develop as in the guinea pigs and rabbits, and that pulmonary tuberculosis can occur secondarily. Likewise, a secondary pulmonary tuberculosis can follow when infection occurs by way of the conjunctiva. The lymph of the head enters the superior vena cava with the neck lymph vessels, and it is believed that bacilli can frequently enter the body by this route naturally. If the bacilli are few enough they can pass the gland filters without producing disease and are then taken up by the endothelial cells of the lung capillaries followed by the development of typical tuberculous nodules. The lung is the organ in which bacilli most easily lodge and an isolated pulmonary tuberculosis can develop without evidence elsewhere. It is believed that the conjunctival infection experiments prove that pulmonary infection can occur without inhalation or ingestion playing any part.—*Die experimentelle Erzeugung der Halslymphdrüsentuberkulose durch orale und conjunctivale Infektion und ihre Beziehungen zu den Erkrankungen der übrigen Organe, insbesondere der Lungen, J. Koch and W. Baumgarten, Ztschr. f. Hyg., 1923, xcvii, 477.*

Avenues of Tuberculous Infection.—Flügge never denied the possibility that moist droplet infection could cause a contact infection originating from the mouth or pharynx, but inhalation infection is, however, the most important and seems proved through numerous experiments. Hygienically, little is to be gained or changed, practically or prophylactically, whether the infection occurs bronchially or orally. Oral infection requires large doses and is not beyond criticism; conjunctival infection likewise is much overemphasized. Many other arguments are advanced. A clarification is thus far not reached and Ribbert's view is again called attention to in that the bacilli will not enter an unbroken mucous membrane. This naturally makes an exact evaluation difficult.—*Bemerkungen zu den vorstehendem Arbeiten von Jos. Koch und Baumgarten über Entstehung der Lungentuberkulose durch orale Infektion und Inhalation, C. Flügge, Ztschr. f. Hyg., 1923, xcvii, 539.*

Avenues of Tuberculous Infection.—This is an elaboration of the foregoing article in the same journal, pages 477–513. The old controversies of v. Behring and Calmette on feeding and Flügge on inhalation infection are reviewed. Flügge does not deny an oral or conjunctival infection, yet gives either no consideration. Baumgarten repeated Findel's inhalation experiments and believes that the inhalation infection of guinea pigs was in reality a contact infection resulting from the mucous membranes of the upper respiratory passages, as proved in

Koch and Baumgarten's previous article in this journal. That, with large doses, experiments, performed according to Findel, also resulted in entrance of the bacilli directly in the lungs is not denied, but it is the rule that the bacillus-containing droplets are picked up by the mucous membranes of the upper air passages (nose and pharynx) and thence enter the blood stream.— *Vergleichende experimentelle Untersuchungen über die Entstehung der Lungentuberkulose durch Fütterung (orale Infektion) und Inhalation, W. Baumgarten, Ztschr. f. Hyg., 1923, xcvii, 514.*

Avenues of Tuberculous Infection.—A critical review of the recent literature is given with a set of established rules. Human infection is with rare exception extrauterine. The most important portal of entry is the mucous membrane of the respiratory tract. The bacilli enter it mainly by inhalation. A metastatic infection of the lungs from other primary foci, such as those of the digestive tract, is far less frequent. The infection of the lungs by tubercle bacilli that have entered the lymphatics of the digestive tract, and thus the blood, without leaving traces, may under special circumstances be possible. Their occurrence and significance in man have not been proved. A purely lymphogenous infection of the lung from the mucous membranes of the digestive tract does not occur.—*Über die Infektionswege der Tuberkulose, H. Beitzke, Ztschr. f. Tuberk., March, 1923, xxxvii, 401.*

Droplet Infection through Coughing.—Cough droplets were determined by means of the formation of Berlin blue or Turnbull's blue on specially prepared paper; and by this method the extent of droplet spread after coughing, sneezing and talking can be determined. This method also differentiates mouth and bronchial droplets. Tuberculous individuals spread droplets mainly in the morning and those with catarrh spread droplets diffusely during coughing. During this time one-third of the droplets can be of bronchial origin and may contain bacilli; these individual droplets can contain up to hundreds of bacilli. Healthy people do not spray bronchial droplets. During coughing and sneezing the droplets are sprayed in straight lines forward, but can settle in any direction. Some may still settle after 1 to 3 hours. They do not remain suspended long in the air after coughing. During talking they are only slight in number. It is believed that droplet infection plays the main rôle in the transmission of influenza, infectious rhinitis and other respiratory diseases. With resistant microörganisms dust infection is possible. Catarrhal consumptives should be especially careful not to spread the infection during coughing.— *Der Nachweis der Hustentröpfchen, ihre Bedeutung für Infektionen, insbesondere bei Tuberkulose, G. Seiffert, Beitr. z. Klin. d. Tuberk., November, 1922, liii, 291.*

Conjunctival Infection of Guinea Pigs.—Attention was called by Calmette and others in 1913 to the possibility of infecting guinea pigs by the conjunctival route. By this method they were able to produce, first, a tuberculosis of the cervical lymph nodes which finally extended to the tracheobronchial nodes and slowly spread to the lungs and abdominal viscera. Lesions at the level of the eye were never observed. This initial and not secondary localization in the tracheobronchial nodes is contrary to Parrot's Law and the observations of Ghon and others. Experiments were undertaken to verify the above observations. By the conjunctival route the author was able to infect guinea pigs as described by Calmette, but, contrary to the findings of the latter, although very late in appearing, there was a definite local inflammatory reaction in the eye itself which generally persisted as a chronic tuberculosis. This usually developed in three to four weeks after inoculation, sometimes later. Animals already infected with tuberculosis usually reacted promptly with a conjunctivitis in the eye used for inoculation, an allergic response. It is interesting to note that in animals infected by the conjunctival route the course of the disease varied according to the dose, being rapid and acute in those receiving the more concentrated emulsions of tubercle bacilli and taking a chronic course in those in which dilute instillations were employed. This was found not to obtain when the same strain of tubercle bacillus was introduced subcutaneously. There was no appreciable difference in the course of the disease between animals receiving 2,000 million bacilli and 2,000 bacilli. The dosage employed for conjunctival infection ranged from approximately 5,500,000 bacilli to 206,000 bacilli, 1 cmm. of any given emulsion being instilled. Inoculation into the subcutaneous tissue with its free vascular and lymphatic communication leads, in normal animals, to immediate generalization of the infection and the simultaneous formation of foci in many tissues and organs, whereas instillation into the conjunctiva leads to the bacilli being shepherded along natural channels to the nearest lymphatic nodes. If their numbers are excessive, some bacilli will be sure to pass through the nodes and on by lymphatic channels until the blood vessels are reached and

general distribution ensues. With small doses of tubercle bacilli, however, the disease tends at first to be localized in the lymphatic nodes and the tissues around the portal of entry, generalization taking place only at a later date. The susceptibility of guinea pigs to subcutaneous inoculation of tubercle bacilli is, in fact, too great to allow the employment of this form of infection in immunity experiments with virulent strains. It would appear that we have, in perconjunctival infection, a method of much greater delicacy, which is capable of application in many directions for the elucidation of the phenomena of tuberculous infection and resistance.—*Infection of Guinea-Pigs by Conjunctival Instillation of Tubercle Bacilli, S. L. Cummins, Tubercle, January, 1924, v, 153.*

Influence of Nutrition, Age and Other General Conditions on Experimental Tuberculosis.—Age, nutrition and pregnancy had no influence on the duration of the disease and the localization of tuberculosis in guinea pigs. Animals kept in the dark did not show any difference from those kept in daylight.—*Experimentelle Untersuchungen über den Einfluss des Ernährungszustandes des Alters und anderer allgemeiner Einflüsse auf den Verlauf der Tuberkulose, H. Gerhartz, Beitr. z. Klin. d. Tuberk., November, 1922, liii, 278.*

Blood Colloids in Tuberculosis in Infancy.—Recent studies of the colloids of the blood during the course of certain infectious diseases, as well as in carcinoma, pregnancy and anaphylaxis, have shown striking deviations from the normal, and apparently paralleling changes occurring in the body. In these conditions there occurs an increased rate of precipitation and diminished dispersion of the colloid-like red blood cells, increased constituents of the plasma and serum, an increase in the fibrinogen and globulin, etc. From a clinical standpoint, these changes are interesting as possible aids in prognosis (activity or progression) rather than in diagnosis. In infectious diseases which readily produce immune bodies (typhus, diphtheria) these reactions are observed only in the early part of the disease; whereas in those conferring little or no immunity (tuberculosis, syphilis), the reactions persist much longer. In tuberculosis there has been observed an increase in the blood protein, as well as an increased index of refraction and diminished conductivity of the serum. Because tuberculosis in infancy must always be considered an active process, due to lack of the time required for healing, this age seemed peculiarly adapted for a study of these factors. Serum from 50 infants was examined, and the reactions repeated at least once. Of these, 19 were well babies, acting as controls for establishing the proper titre used in the method, 5 were sick infants with fever but free from tuberculosis, and 26 had tuberculosis. The method used was a modification of the precipitation test of Daranyi (utilizing alcohol, salt and heat) and the results were as follows: The reaction was negative in all the well babies. In those ill with nontuberculous infections, there occurred during the acute stage of the illness a moderately positive reaction, which remained constant during the illness and disappeared with convalescence. The reactions among the tuberculous infants could be placed in three groups: (1) the mild cases with little fever and slight physical and roentgenological findings,—4 cases, all moderately positive, the reaction remaining constant or growing stronger in the later course of the disease; (2) moderately severe cases with more striking findings and persistent higher temperatures—4 cases, all strongly positive, and remaining so; (3) very severe cases with marked lung changes and rapid loss in weight —18 cases, all very strongly positive. It is interesting to note that several of these infants with a former strongly positive reaction showed a weaker positive shortly before death, coincidently in most instances with the change from a positive Pirquet to a negative tuberculin reaction. The effects on the reaction of the so called *stalagmones* (surface active substances occurring in urine under certain conditions) were also observed. The stalagmones (prepared from the urine of tuberculous infants) added to normal urine produced a positive reaction with normal serum. Normal serum plus the urine of the infants with severe tuberculosis likewise gave a positive reaction.—*Kolloidchemische Blutuntersuchungen bei Säuglingstuberkulose, J. Duzár, Jahrb. f. Kinderhk., May, 1923, lii, 69.*

Tuberculous Infection of One Infant Twin.—Twins lay together in a bed for a period of barely three months. One died of caseous pulmonary tuberculosis and the other, three weeks later, was found free from tuberculosis at autopsy. The infection originated from a case of fibrocaseous phthisis in the same household, in an older sister who was apparently well and associated mainly with the one child.—*Beitrag zur Tuberkuloseinfektion im Säuglingsalter, J. Petschek, Beitr. z. Klin. d. Tuberk., November, 1923, liii, 345.*

Latent Tuberculosis in Infancy.—Of the cases examined, 6.6 per cent were found to have latent tuberculosis, which illustrates the great prevalence of the disease among the lower classes, as well as the ease with which infants contract it. The incidence of manifest tuberculosis was low enough to be in accord with that of autopsy reports. It is probable that primary tuberculous infection does not always conform with the process described by Escherich, Ghon, and others, but that tuberculosis of the peribronchial lymph nodes may occur without preceding specific pulmonary lesions.—*Contributo allo studio della tubercolosi latente nei lattanti, A. Corica, Pediatria, October 1, 1923, xxxi, 1032.*

Action of X-Rays on Respiratory Metabolism in Tuberculous Children.—After irradiation there is a greater activity of the oxidative processes, and in spite of the diminution in the quantity of oxygen absorbed the products of combustion are increased. There is a decided influence of the X-rays on gaseous interchange, which the author asserts to be analogous to, though less pronounced than that exercised by sunlight.—*Influenza dei raggi Rontgen sul ricambio respiratorio nei bambini tubercolotici, A. Corica, Pediatria, August 15, 1923, xxxi, 868.*

Acute Tuberculosis in Infancy Simulating Typhoid Fever.—The similarity of acute miliary tuberculosis in infancy to typhoid fever, its differential diagnosis and its uniformly fatal prognosis, are discussed in detail. Five cases are presented.—*Forme tifosimili della tubercolosi acuta nella infanzia, F. De Angelis, Pediatria, July 1, 1923, xxxi, 689.*

Danger of Tuberculous Infection in Early Childhood.—Of nurslings and 2-year-old children in tuberculous surroundings, 67.5 per cent of the former and 84.4 per cent of the latter were infected. Severely ill patients infected practically all the small children in contact with them. The mildly ill are not without danger. The mortality among the infected sucklings was only 26 per cent and the remaining living children developed in a normal manner. Separation of children exposed to infection is necessary, and the more so the more severe the pulmonary process and the poorer the living conditions of the family.—*Die Gefährdung des frühen Kindesalters durch Tuberkulose, Margarete Röpke, Beitr. z. Klin. d. Tuberk., February, 1923, liv, 252.*

Incidence of Tuberculous Infection at School Age.—The incidence of tuberculous infection cannot be determined by a single Pirquet test. The test should be repeated at four-day intervals and different tuberculins used. Negative cases should be tested intracutaneously. A series of 800 cases is reported.—*Zur Häufigkeit der tuberkulösen Infektion im Schulalter, O. Wiese, Beitr. z. Klin. d. Tuberk., December, 1922, liii, 470.*

Tuberculosis of School Child.—Although the incidence of tuberculous infection among school children in German cities will average from about 56 per cent in the younger to 66 per cent in the older groups, the number giving clinical evidences of the active disease is much smaller. Umber, for instance, states that, of the children between seven and fourteen years of age, before the war 30 per cent of those infected showed clinical evidence of the disease, with a mortality of 6.5 per cent; whereas during the war 29.5 per cent were clinically tuberculous and 27 per cent died. In a large hospital in Berlin-Lichtenberg, during the war only 6.1 per cent of the admissions were for tuberculosis, and this figure was as low as 3.2 per cent in 1921. The mortality among the tuberculous children, however, averaged 32.5 per cent during the war and thereafter fell steadily to 13.6 per cent in 1921. Taking the average of sixteen large German cities, definite pulmonary tuberculosis was determined in only 0.9 per cent of the school children. The mortality curve for tuberculosis (all ages), computed for each 10,000 inhabitants, decreased 56 per cent in Prussia from 1876 to 1913, with a marked increase in mortality rate during the war. However, the mortality rate showed much less decrease in childhood than in later life, and least of all between the ages of five and fifteen years. Whereas the reduction at this age period was only 29.5 per cent, it amounted to 63 per cent between thirty and sixty years. Moreover, during adolescence (15 to 20 years) the mortality from tuberculosis comprises nearly one-half the mortality from all causes. Prophylactic measures for the school child are therefore most important at about the age of puberty and the years immediately following.—*Über die Tuberkulose des Schulkindes, J. Peiser, Jahrb. f. Kinderhk., June, 1923, lii, 129.*

Tuberculosis among German School Children.—The reported increases in the death rate from tuberculosis among school children during the war are not entirely

reliable, as reporting of cases was faulty. As the school physican has been able to divorce his work from that of the city tuberculosis services, the number of tuberculosis cases among the children has increased greatly, because now all the cases are sought out by the school physician and are reported by him. In 1921, while under the city service, there were reported 182 cases of tuberculosis in the public schools of the city of Ostern, but under the school physician service the reported cases in 1922 were 646 and in 1923 were 1150, in the proportion of 500 boys to 650 girls. It is important for the school physician to discover the cases of obscure tuberculosis (lungs, tracheobronchial nodes, or elsewhere) and safeguard the other school children from these sources of danger.—*Lungentuberkulose bei Schulkindern, W. Stephan, Klin. Wchnschr., August 13, 1923, ii, 1559.*

Problem of Caring for Childhood Tuberculosis.—A new clinic opened in Jena in 1923 has provision for observation and treatment of 10 infants and 15 children. Many difficulties are encountered in examining and following the tuberculous child in the home, and an observation station has thus been opened in Thüringen where the physician may hold his patient for observation and treatment. Such an institution should, for obvious reasons, be connected with the university. Nursing and home attention of sick children are of great importance.—*Die neue Kindertuberkuloseklinik zu Jena und die Aufgaben der Kindertuberkulosefürsorge, J. Duken, Klin. Wchnschr., October 1, 1923, ii, 1848.*

Appraisal of Children with Healed Tuberculosis.—Too frequently a diagnosis of tuberculosis is made upon insufficient evidence. Enlarged lymph nodes of the neck which are not giving symptoms, a positive Pirquet reaction, or X-ray evidence of hilum node involvement is not sufficient evidence to justify a diagnosis of tuberculosis, and only the most certain symptoms can be relied upon as a basis for diagnosis. Many school children are unfairly labelled tuberculous. Children with tuberculosis should not be allowed to go to work, however, until all signs of the disease have disappeared, and then only to such occupations as will allow the safeguarding of children with such a background.—*Ueber Berufsberatung tuberkulöser Kinder, L. Dünner, Deutsche med. Wchnschr., October 5, 1923, xlix, 1271.*

Pulmonary Tuberculosis of Childhood.—The Ranke classification is not applicable to tuberculosis in children since the various stages blend in this age group. The thoracic, supraclavicular, and cubital lymph nodes are more important diagnostically. The tuberculin reaction is considered of diagnostic significance and shows three groups of patients: (1) definitely active tuberculous children with weak cutaneous and weak intracutaneous and subcutaneous sensitiveness; (2) predominantly active processes with marked cutaneous and weak intracutaneous and subcutaneous sensitiveness; and (3) active and inactive cases with marked cutaneous and marked intracutaneous and subcutaneous sensitiveness.—*Zur Klinik der kindlichen Lungentuberkulose jenseits des Säuglingsalters, K. Dietl, Beitr. z. Klin. d. Tuberk., March, 1923, liv, 353.*

Transient, Inflammatory Tuberculous Symptoms in Children.—The reaction of the body of the child in the early forms of tuberculous infection leads to the manifold transient inflammatory symptoms for which there must be considered a specific etiology, even though anatomic evidence is to a great extent lacking. Whether bacilli, probably of low virulence, or tuberculotoxins are the cause requires further study. Erythema can be considered definitely of toxic origin, as well as the roseola-like exanthemata of miliary tuberculosis. In 3 cases (once after an intracutaneous reaction, after a Ponndorf test, and during a tuberculin treatment) there were seen herpes-like efflorescences (once a typical herpes zoster occurring). Certainly erythema nodosum can be considered of tuberculous origin. On the other hand, the relation of psoriasis and tuberculosis is not verified from numerous personal observations. It is agreed with Warnecke that tuberculin acts only as a generally injurious agent in psoriasis. Phlyctenulae of the cornea are believed to be due to the scrofulous diathesis. Transient edemas are considered, with Quincke, of endogenous origin from tuberculotoxins, as is also an urticarial eruption. Three cases of joint tuberculosis showed a tendency to develop purpura, probably due to a vascular injury. In a 6-year-old child there developed transient nodules on the body and head, disappearing within 8 weeks. Microscopically, they proved to be granulomata, containing individual giant cells, they were well vascularized and they tended to degenerate. Transient tuberculous rheumatisms are considered of toxic origin. Transient meningeal affections are also considered of toxic origin or due to mild bacterial infections. Transient

epituberculous infiltrations of the lungs, and exudative conditions of the pericardium and peritoneum are also discussed.—*Über die flüchtigen, entzündlichen tuberkulöser Krankheitserscheinungen bei Kindern, E. Rüscher, Ztschr. f. Tuberk., January, 1923, xxxvii, 241.*

Prognosis of Abdominal Tuberculosis in Children.—A series of 250 cases of abdominal tuberculosis were observed over a period of years. Under this head were included tuberculosis of the intestines, mesenteric nodes and peritoneum. Tuberculosis in childhood spreads by the lymphatics and is nearly always primary in the lymph nodes. Abdominal tuberculosis is common under the age of five years but most common at the age of three. Its occurrence at the end of the first year is more common than is usually thought to be the case, and it is then especially fatal. It is stated that more than 50 per cent of the cases are due to the bovine type of bacillus and rather less than 50 per cent to the human type. It may occur as part of a general tuberculosis or as a secondary infection from the chest. Cow's milk is certainly not a common cause of abdominal tuberculosis. In Japan and China the children are breast-fed for many months and there is little or no milk other than that of the breast given to the children, yet tuberculosis and especially abdominal tuberculosis is widely spread among the children. In the poorer districts of our large cities far less milk is consumed by the children than in the better class ones, and yet tuberculosis is more prevalent in the former. Before being pronounced cured, a case should be symptom-free for at least two years. The outlook for abdominal tuberculosis is much worse than the outlook for pulmonary tuberculosis in children. Abdominal tuberculosis is a potent cause of sterility in females by causing adhesions and damaging the reproductive organs. Many cases relapse after being apparently cured for a time. The outlook is practically hopeless under the age of one year and not much better under the age of two years. However, as the age increases the outlook improves considerably, although the disease is always one to cause anxiety. The more that can be felt in the abdomen the worse as a rule is the prognosis. The type with ascites does better on the whole than the other types and this class of case often responds well to operative treatment. The after-histories of children who have had abdominal tuberculosis and have kept well for some years are good, even though there are still enlarged calcareous nodes to be felt in the abdomen.—*The After Results of Abdominal Tuberculosis in Children, H. T. Ashby, Brit. M. J., November 10, 1923, no. 3280, 863.*

Wildbolz Reaction in Children.—The urine of definitely nontuberculous infants (Mantoux reaction repeatedly negative), when concentrated according to the Wildbolz method, gave negative reactions, not only on these same infants, but also in older children with positive tuberculin and auto-urine reactions. The same infants were then given 0.5 mgm. O. T. subcutaneously, and a 24-hour specimen of urine collected for a repetition of the Wildbolz reaction. The auto-urine reaction in the nontuberculous infants remained negative, but the test was definitely positive in older children with tuberculosis. In a series of 62 cases of various types of tuberculosis, among which were clinically active and latent cases, the Wildbolz reaction was negative seven times and doubtful once. The Mantoux reaction in these seven cases was weakly positive in three, negative in one, doubtful in one and definitely positive in the other two. All other cases gave positive Mantoux reactions. The Wildbolz reaction may therefore be considered a specific reaction depending upon some tuberculin-like antigen, but of no value in distinguishing between active and latent cases.—*Zur Spezifität der Wildbolz Eigenharnreaktion und ihre Bewertung, W. Marcus, Monatschr. f. Kinderhk., July, 1923, xxvi, 400.*

Tuberculin-Reacting Cattle without Lesions.—A certain percentage of animals give positive tuberculin reaction but at slaughtering show no tuberculous formations. This is to be expected for two reasons: (1) examination of the entire body is not made with sufficient thoroughness to be sure that no process exists and (2) the tuberculosis of the animal may be too early for gross changes. Of 4,066 cattle giving a tuberculin reaction and showing no lesion at autopsy, 906, or 22.28 per cent, showed infection upon closer, microscopic examination and animal inoculation of tissues. The specificity of the tuberculin reaction suggests that although no lesions were found in the other animals they must have existed. The spontaneous healing of tuberculosis has not been proved to be as common in cattle as in man, and we cannot assume that a tuberculin reaction in cattle does not mean active, clinical tuberculosis. It is better to assume that about 40 per cent of all apparently healthy cattle which give tuberculin reactions are disseminating tubercle bacilli.

Cattle may be sensitized with human or dead bacilli. In cattle infected with human bacilli the first tuberculin test is positive, later ones are negative and the sensitiveness from dead bacilli is quite transient. Some of the reacting animals without lesion may be infected (but not diseased) with human bacilli from occasional attendants sick with tuberculosis.—*No-Lesion Tuberculin-Reacting Cattle, E. C. Schroeder, J. Am. Vet. M. Ass., February, 1924, lxiv (new series, xvii), 544.*

Avian Tuberculous Infection in Cattle—Will avian tubercle bacilli produce tuberculosis in cattle? The occurrence in the field of a form of skin tuberculosis in cattle on a ranch where there was considerable avian tuberculosis suggested an experiment which was done in the following way: Six yearling steers, free from tuberculous infection (giving no tuberculin skin reaction) were infected with a pure culture of avian tubercle bacilli of proved virulence for hens. Infection was done subcutaneously in two, intracutaneously in two and intramuscularly in two. Four normal steers were kept uninfected as controls. Four months after infection three of the six had palpable nodules at site of inoculation. All were well. At five months all animals were given ophthalmic, intracutaneous and subcutaneous tuberculin tests; in three these were positive to intracutaneous test, in one suspicious, in two negative (intracutaneous inoculation) and in four uninfected controls negative. Excision of local foci, retesting, and then autopsy are to be done.—*Injection of Cattle with B. Tuberculosis (Avian) and Results of Subsequent Tuberculin Tests, C. Elder and A. M. Lee, J. Am. Vet. M. Ass., January, 1924, lxiv, 440.*

Transmutation of Human to Bovine Tubercle Bacilli in Cattle.—The experiments from 1903 to 1911 by Eber indicated, in a limited number of cases, that there was a transformation of the human type of tubercle bacillus to the bovine type, after the subcutaneous and intraperitoneal inoculations of tuberculous material, preferably guinea-pig organs, into calves. A repetition of this work by Kenfeld, Dold and Lindemann, with modified technique was not corroborative. The work was repeated in 1912 but was discontinued during the war. The plan followed was to inoculate the same material, from 8 cases of pulmonary tuberculosis in man, into guinea pigs and rabbits and then follow this by its passage to cows. Mixed cultures were never obtained by this procedure. In the Leipzig experiments, twice there were no takes in cows, in 2 others slight changes, and in 3 cases extensive disease, but no mutation after 2 passages. Too prolonged a wait before killing the cows proved undesirable, since there occurred a reduction in virulence; three months proved to be the best time. In one cow there occurred a fatal, disseminated peritoneal tuberculosis, which proved not to be a mixed infection. Other cows were infected from this animal and there was an increased virulence for rabbits. Likewise, the growth on artificial media became altered. The changes could not be attributed to type alteration, but appeared to be merely an approach to the bovine type. Further, an atypical human strain, with outspoken rabbit virulence but lack of virulence for cattle, after subcutaneous and intraperitoneal inoculation became virulent for cows, while by subcutaneous inoculation alone it remained avirulent for cows. It is therefore evident that subcutaneous inoculation does not suffice to alter the strain; but 5 cgm. must be injected subcutaneously and intraperitoneally. Besides, it was found that tuberculin tests of cattle were not always reliable, for 5 of 48 had small calcified nodules in the mesenteric and mediastinal lymph nodes in spite of negative tuberculin reactions. In Berlin the experiments could not be carried as far as in Leipzig on account of the war. In 4 cases there occurred a transient transformation in the peritoneum of the inoculated cattle. Mixed infections were excluded. The conclusion is drawn from these studies that by utilizing the Eber method of inoculation the human bacillus approaches the bovine type during passage in cattle.—*Neue Passageversuche mit menschlichem Tuberkulosematerial (Ein Beitrag zur Frage der Typenumwandlung der Tuberkelbacillen), A. Eber and L. Lange, Beitr. z. Klin. d. Tuberk., January, 1923, liv, 1.*

Pulmonary Tuberculosis in Cases of Surgical Tuberculosis.—The occurrence of pulmonary symptoms in two surgical tuberculosis cases under sun treatment raised the question of the frequency of this coincidence. This question is at present important because the modern treatment of surgical tuberculosis is based on the conception that the tuberculosis is a general and not a local disease. The coexistence is anatomic rather than clinical. Clinicians have not watched for pulmonary lesions in surgical tuberculosis. The material examined covered 100 cases of surgical tuberculosis of various ages. Of these, 33 per cent gave a family history of tuberculosis, 53 per cent had a history of pulmonary infection and in 22 per cent both family and pulmonary histories were positive. In 14 per cent

tubercle bacilli were found in the sputum, and in 81 per cent old or active lung lesions were found clinically and roentgenologically. Family history, pulmonary history, and pulmonary findings in questionable cases deserve consideration for diagnostic purposes. Therapeutically, general treatment is recommended. Pulmonary lesions are to be watched for, to avoid possible danger of harm by sun treatment. Pathogenetically, it is believed that nearly all surgical cases of tuberculosis develop metastatically from a healed or active pulmonary lesion.—*Lungenuntersuchungen bei chirurgisch-tuberkulösen Kranken, W. Alwens and M. Flesch-Thebesius, Beitr. z. Klin. d. Tuberk., March, 1923, liv, 299.*

Tuberculous Lobar Pneumonia.—In a study of lobar pneumonia an occasional case was encountered with symptoms of lobar pneumonia and a corresponding picture of lobar consolidation, but with a more protracted course and ultimately proved to be of tuberculous origin. In the last four years 13 cases have been encountered which could be established as undoubtedly of this type. The clinical course of these cases varied from that seen in true lobar pneumonia of uncomplicated inflammatory origin. The onset may be sudden with chills or chilly sensations, followed by high temperature, rapid respirations and pain in the chest. As a general rule, however, patients affected with this type of tuberculous pneumonic involvement do not present the same critical picture as true lobar pneumonia. The respiration rate is rapid, but not to the degree of dyspnea attained in inflammatory cases. The leucocyte count may be high, but never reaches the proportions encountered in pneumococcus lobar pneumonia. The sputum is never of the prune-juice type. Patients do not appear as sick as individuals suffering from pneumococcus lobar pneumonia. The site of the lesion has been chiefly in the upper lobes, the right being the most common. Defervescence is by lysis. When the time for crisis has passed and there is no clinical evidence of resolution and the fever persists, one excludes pneumococcus lobar pneumonia. A differential diagnosis from the X-ray alone cannot be made. The sputum generally shows large numbers of tubercle bacilli. Nurses previously affected with a trivial lesion are especially prone to this type of lesion, owing to the character of their work. Resolution of the consolidation requires several months and is brought about by excavation and cavitation. The shadows, previously of more or less uniform density, become mottled and blotchy in appearance, and there is evidence of cavity formation. The cavities are usually multiple, well defined, and occasionally become fibrosed. Even in the most favorable cases complete resolution does not occur. According to Delafield and Prudden the tubercle bacillus causes three types of reaction in tissues: the productive type, causing the proliferation of connective tissue cells, and fibrous tissue formation; the exudative type, causing migration of cells from the blood vessels and formation of exudate; and the necrotic type, resulting in the destruction of tissue, from the toxins of the microörganism. In these cases it is the exudative type that occurs. Serial roentgenographic examination of the chest shows this lesion to be more common than has heretofore been believed.—*Tuberculous Lobar Pneumonia (Pneumonic Caseous Tuberculosis), L. R. Sante, Amer. J. Roentgenol. & Radiol. Therap., January, 1924, xi, 55.*

Tuberculous Pneumonia.—Pneumonic tuberculosis preferably develops in the upper lobe of the right lung. During the past three years 28 cases (16 male and 12 female) were observed in the St. Blasien Sanatorium. In the characteristic cases there was an acute onset, high fever, chest pains, dyspnea and a resemblance to pneumonia. Some cases had a subacute onset but a rapid development with rapid loss of weight and strength. The roentgenograph markedly resembles a genuine pneumonia. The results of sanatorium treatment were surprising, since 46.4 per cent became capable of earning their own livelihood. The prognosis is not entirely unfavorable. The occurrence of cavities is significant prognostically, since they may occasion severe hemorrhages. Likewise, complications (hemorrhage, laryngeal and intestinal tuberculosis, influenza and pleuritis) are of prognostic significance. Laryngeal tuberculosis is usually an unfavorable complication. In the progressive cases all kinds of tuberculin treatment, raying or irritation treatment, are contraindicated. Pneumothorax treatment is to be applied with great caution. After connective-tissue induration has begun quartz-roentgen ray therapy is a good aid to treatment.—*Beitrag zur Entwicklung und dem Verlauf der exsudativ-pneumonischen Lungentuberkulose im rechten Lungenoberlappen, H. Rennebaum, Beitr. z. Klin. d. Tuberk., March, 1923, liv, 309.*

Pigment in Visceral Pleura.—Striped deposit of pigment in the visceral pleura are not always found, even in the presence of definite pigmentation. The pigment stripes, when formed, run in the intercostal spaces. In the lower portions of the lungs the deposits

decrease as a result of respiratory movements and, when still visible, are seen on the upper rib borders. The pigment stripes are much more frequent among females. The smallest amount of pigmentaton in both sexes is seen in those places where the respiratory movements are greatest, the largest amounts in the less motile parts. In the abdominal-breathing man the slightest pigmentation is seen at the costophrenic angle and the diaphragmatic borders, and there is a more marked pigmentation of the right side as compared with the left side. The origin of the different pigment deposits in the various lung zones, as also the stripes in the intercostal areas, is to be sought in the more or less difficult transport of the pigment granules which is dependent on the lymph current. The lymph flow is influenced by the mechanical action of the chest walls.—*Über das Vorkommen und die Entstehung streifiger Pigmentablagerungen auf der Pleura pulmonalis, W. Kyrieleis, Beitr. z. Klin. d. Tuberk., March, 1923, liv,* 383.

Latent Tuberculosis.—Title only given.—*On Latent Tuberculosis, K. Ohno, Kekkaku Zasshi, March, 1923, v, no. 9, title from Japan Medical World, December, 1923, iii, 274.*

Influence of Position on Lung Excursion.—Extensibility is the quality that is first modified in all diseases of the pleura, parenchyma and bronchial tree. Alterations of volume and density come at a later stage. The study of thoracic excursion comprises interpretations of the functions of the scaleni, intercostals and diaphragm, and the exquisitely nice balance of their powers that is disturbed in many diseases. To study the balanced actions of these three groups of muscles accurately, interference from other factors must be excluded. Being conscious of the act of breathing may upset the balance between these different groups of muscles. A strong activation of the inspiratory muscles may mask disparities in excursion that are clearly perceived with more moderate respiratory effort. If the patient stands erect the large recti and the oblique and transverse muscles of the abdomen pull the entire sternum with the attached ribs in a caudad direction, and thus obscures any fine differences there may be in the upper lungs. Therefore, to study respiratory excursion of the anterior inferior or lateral aspects of the thorax the patient should lie on his back and breathe automatically. The upright position should be assumed only to show excursion of the posterior aspects of the thorax.—*The Importance of the Patient's Position in Studying Lung Excursion, C. F. Hoover, J. Am. M. Ass., November 10, 1923, lxxi, 1602.*

Comparison of Vital Capacity Constants and Standards.—There has been a general revival of interest in the study of vital capacity since 1917. Many methods have been advocated for determining standards and many different formulae. Hutchinson originally attempted to show that the standard vital capacity varied directly with the height. Later Dreyer demonstrated that the standard vital capacity varied more closely with the body surface than any other measurement. West and others confirmed this. However, it was thought advantageous to compare the results obtained, using various methods on the same group. Therefore, 165 men and 166 women were selected for study from a preoperative surgical group at the Mayo clinic. Patients suffering from cardiac or pulmonary conditions, inanition or cachexia were eliminated. Most of the subjects came from the middle western states and western Canada. A specially constructed type of water spirometer was used. All readings were taken standing and with clothing removed from the chest, and physical measurements were also with clothing removed. In summarizing the tables, it is found that in the case of males the vital capacity calculated by West's formula (body surface x 2500) gives the closest agreement with the observed vital capacities, while Dreyer's calculation based on height and chest circumference gives almost identical results. In the case of females, West's formula (height in cm. x 20) expressed the closest agreement, his body surface formula (body surface x 2000) coming next. For the female, measurements based on chest circumference are less accurate, owing to the difficulty in making such measurements. An easy method for quickly determining body surfaces from height and weight is shown in an accompanying chart, constructed by Boothby and Sandiford.—*Comparison of Constants for the Determination of Vital Capacity, W. S. Lemon and H. J. Moersch, Arch. Int. Med., January 15, 1924, xxxiii, 118.*

Basal Metabolism and Vital Capacity.—Investigations were made to determine whether there is any fixed relationship between basal metabolism and vital capacity, and 85 subjects with goitre were examined. Repeated determinations were made on as many of the subjects as possible, in order to determine any change or variation. It was found that in the largest percentage of instances there was a tendency toward decreased vital capacity with increased metabolic rates, but that, especially in exophthalmic goitre, there was no constant relationship. It was found that most of the subjects with decreased vital capacity had

also some degree of cardiac decompensation, with which it had a direct relation. It was these patients whose vital capacity increased with rest. A good subjective index of cardiac insufficiency was dyspnea. No correlation was observed between the vital capacity and the severity of the symptoms referable to thyroid disturbance, nor was there any relation to exophthalmos or crisis. It therefore seems that cardiac insufficiency is the direct cause of any decrease in vital capacity observed in hyperthyroidism.—*Basal Metabolism and Vital Capacity, W. S. Lemon and H. J. Moersch, Arch. Int. Med., January 15, 1924, xxxiii, 118.*

Vital Capacity and Operative Risk.—In view of the fairly accurate estimation which vital capacity gives of a person's physical fitness, it seemed plausible that the method might be used in estimating operative risk. Determinations were, therefore, made on 379 consecutive patients before operation and checked against the final outcome, and also compared with the surgeon's own statement of the risk. It is concluded that for ordinary purposes the latter is probably more satisfactory, but that, especially in questionable cardiac and pulmonary conditions, vital capacity determinations may be of great aid and that the closer the approximation of the vital capacity to the tidal air, the greater the risk.—*Vital Capacity in Relation to Operative Risk, W. S. Lemon and H. J. Moersch, Arch. Int. Med., January 15, 1924, xxxiii, 128.*

Factors Influencing Vital Capacity.—Sex appears to have a constant influence, not only in adults but also in children, males always giving the higher readings. Physical fitness is a most important factor, athletes giving always higher than normal averages and those in poor condition the reverse. Age is a factor of rather uncertain value, and seems to have no great influence before 50 or 60 years. Even old men, if well preserved and in good condition, may give normal readings. The degenerative changes which accompany advancing years play the chief rôle in the gradual decrease, which runs parallel with changes in bodily turgor and elasticity. Thoracic deformities undoubtedly deserve serious consideration. Flexibility of the thorax influences vital capacity. Peabody and Sturgis found in cardiac cases that general muscular weakness and fatigue are not important factors. Others, however, have found that in cases of "irritable heart" there is a marked decrease after exercise. Weakening of the respiratory muscles from whatever cause must be an important factor, as can be shown in cases where some of them are paralyzed. Abdominal pressure is important chiefly as it affects the movements of the diaphragm. Although pregnancy cases have been found to give normal readings, in other cases with abdominal tumors reductions have been observed. Anything infringing on the pleural cavity and reducing lung volume will cause a decrease in vital capacity. Such are pleural effusion, pneumothorax, tumors, etc. Pleural adhesions reduce the vital capacity by restricting the excursion of the lung. Interference with ingress or egress of air, as in bronchial asthma, causes a reduction. The vital capacity in cardiac conditions varies directly with the cardiac efficiency. The same is true in hyperthyroidism. Extraneous influences include position, atmospheric pressure, temperature, humidity, and light. The exact effects of these factors are somewhat uncertain, although they undoubtedly affect readings to some degree.—*Factors Influencing Vital Capacity, W. S. Lemon and H. J. Moersch, Arch. Int. Med., January 5, 1924, xxxiii, 136.*

Effects of Various Types of Dyspnea on Vital Capacity.—Dyspnea is one of the most constant findings in patients with heart disease, and Peabody and Wentworth have found it to be paralleled by a decrease in vital capacity, which they attribute to such mechanical factors as diminished pulmonary elasticity due to passive congestion, pleural transudates, enlargement of heart and liver, etc. There are, however, cases in which such conditions are absent, but vital capacity nevertheless reduced, and Peters and Barr believe that the diminished vital capacity in heart disease does not depend primarily on anatomic factors, especially since it increases rapidly with the establishment of compensation. They offer, however, no alternative explanation; consequently various types of experiments were undertaken to find one. Normal persons were rendered dyspneic by (1) rebreathing air, thereby increasing the carbon dioxide tension, (2) muscular effort (running), (3) combined running and rebreathing and (4) breathing air with reduced oxygen tension. The effects of anoxemia were studied by using soda lime to absorb the carbon dioxide produced by rebreathing. The rebreathing tests were continued until the subject could no longer hold out, and in two ways, namely, with tidal air and amplitude, and with full vital capacity amplitude. The tidal duration of rebreathing depends on the rate of change in composition of inspired air, namely, the increase in carbon dioxide tension and decrease of oxygen tension. Eventually there is a point of extreme dyspnea, making

it impossible to continue longer, termed by Peters and Barr the "point of intolerance to CO_2." Joannides found in these experiments a definite but variable decrease in vital capacity up to about 25 per cent, in general proportionate to the degree of dyspnea. This decrease appears more closely related to the increase in tidal air amplitude than the rate of respiration. A few experiments were performed with the subject breathing atmospheric air at vital capacity amplitudes against resistance. Here there was observed a decrease in vital capacity of from 7 to 16 per cent, undoubtedly due to fatigue of the respiratory muscles, as cramping and discomfort were observed. When rebreathing was carried out at vital capacity amplitudes, the vital capacity began to diminish gradually from the beginning, finally decreasing from between 6.4 to 35.8 per cent. As the point of intolerance to CO_2 approaches, the degree and rate of decrease become marked. For the production of dyspnea from exercise, running was chosen, floor exercises being found to produce little or no increase of ventilation. Some athletes recovered so promptly that little or no change in vital capacity occurred. The tidal air, however, was constantly higher than normal sooner after exercise. Rebreathing after exercise, as in normal subjects, lowers the vital capacity and the holding breath time. The experiments with the subject breathing air of reduced oxygen tension were unsatisfactory because of the great discomfort and serious symptoms of anoxemia experienced almost immediately. *Summary:* 1. Dyspnea was produced by the use of exercise, increased carbon dioxide tension in the inspired air and oxygen want. 2. When the pulmonary ventilation was increased, there was a decrease in the vital capacity. 3. The use of oxygen want for the production of dyspnea does not give well controlled results with reference to the study of vital capacity. 4. In a few experiments exercise produced a slight but noticeable increase in vital capacity. 5. After exercise a condition is produced in the body that is quite analogous to that in patients with heart disease with reference to their vital capacity, the tendency to dyspnea and the shortened rebreathing interval. 6. The decrease in vital capacity of the lungs is secondary to dyspnea and depends primarily on conditions which produce dyspnea. 7. Dyspnea, as experimentally produced, always was marked before any appreciable reduction of vital capacity was obtained. It is possible in patients who are physically incapacitated by disease that dyspnea may have a much more marked effect on the vital capacity of the lungs. 8. The reduced vital capacity, in part at least, is presumably due to the dyspnea which enters into the make-up of the clinical picture in patients with cardiac disease.—*The Effect of Dyspnea Variously Produced on the Vital Capacity of the Lungs, M. Joannides, Arch. Int. Med., January 15, 1924, xxxiii, 145.*

Pulmonary Tuberculosis and Vegetative Nervous System. Only the tuberculous, sensitized body reacts to tuberculin; but it may also react to other irritants, and in like manner. The severity of the reaction is not only dependent upon the grade of the specific allergy but also depends upon vasomotor conditions. This accounts for the discrepancies in the use of various preparations and methods for measuring the immunity titre for diagnostic or prognostic purposes. The explanation of tuberculin action is also made difficult by these vasomotor influences. In a previous communication it was shown that the reaction to tuberculin, which is viewed as a vascular poison, can be depressed by vasoconstriction. Adrenalin abolishes the reaction in the same person in whom the tuberculin alone was active in cutaneous, intracutaneous and Pirquet tests, but only in those in whom the sympathetic nervous system is hypersensitive. As a measure of sympathetic irritability, use was made of the speed and height of blood pressure increases after subcutaneous injection of 0.5 cc. of 1 to 1000 adrenalin according to Dresel's method. Thirty-five cases were here reported, in which the second tuberculin dose was one-half or twice as large as the first, a depression in temperature occurring in 19 cases, of which 15 had a normal or increased and 4 a low sympathetic irritability. Of the 16 cases in which the second tuberculin injection, coincident with tuberculin injected subcutaneously, caused no fever, 13 had a weak and one a normal sympathetic irritability, while 2 cases previously had shown a rapid rise and high blood pressure. Further, by means of pilocarpin, acting oppositely to adrenalin, concluded cutaneous, intracutaneous and puncture reactions could be made to flare up again. Likewise, the characteristic night sweats of tuberculosis are attributed to the pilocarpin, as to vascular dilatation occasioned by "autotuberculinization." Vascular dilatation is attributed to stimulation of dilator fibres and not to the depression of sympathetic constrictor fibres. Two common symptoms of progression in tuberculosis, pulse increase and lowered blood pressure, are attributed to the vasomotor action of the chronic "autotuberculinization," while adrenalin increases the blood pressure and diminishes the pulse rate. The action of

certain specific preparations on the blood pressure and pulse was accurately studied and in the majority of cases there was a definite increase of the blood pressure following the first injection, while a gradually decreasing influence could be ascertained with increased anergy. The focal reaction is attributed to the vascular dilatation occasioned by the tuberculin and the related general reaction or the temperature rise. If in a person, as a result of elimination, there occurs no fever, but tuberculin or other irritant action causes a vasodilatation, then the increased cell decomposition products which result from such action enter the circulation in larger amounts and stimulate the heat centre, causing fever. Similarly, deficient elimination, by constricting the bronchi as a result of hyperemia, can play a part; at least, it is not necessary to call upon the tuberculotoxins to explain the fever in tuberculosis; the absorption of autogenous body-cell disintegration products is a sufficient irritant to alter heat regulation. Sympathetic-otonic individuals develop commonly a favorable type of pulmonary tuberculosis, while those with the severe exudative forms have vagotonic symptoms (tendency to sweating, diarrhoea, low blood pressure, tuberculin hypersensitiveness) and the adrenalin action is slight. This also explains the severe course of tuberculosis in infants with their juvenile vagotony, and the mild course among arthritics who have a constitutional sympatheticotony. This agrees also with the observations of Schmorl and Luksch, who found, in chronic cases of tuberculosis, a normal or increased adrenalin content of the adrenals, and in acute cases low values. It can be reasoned that tuberculous infection sensitizes the vegetative nervous system in the sense that it increases the vagus irritability and diminishes the sympathetic.—*Lungentuberkulose und vegetatives Nervensystem. II. Zur Theorie der Tuberkulinwirkung, E. Guth, Beitr. z. Klin. d. Tuberk., February, 1923, liv, 186.*

Vasomotor Nerves in Lungs.—The innervation of the lungs of *Rana nigromaculata* and *Bufo bufo japonica* was studied. In these frogs there are pulmonary vasomotor nerves although they are not very active. The peripheries of these nerves reacted to adrenalin but a larger amount was necessary to ensure the usual general effect. The nerves belong to the vagus group and run alongside the sympathetic nerve trunks. The centre lies in the medulla oblongata, the nerve fibres descending thence in the spinal cord and emerging at the third or fourth, and sometimes the fifth, anterior root. They follow the sympathetic nerve trunk and reach the ganglion of the vagus, with which they anastomose, and then go into the lungs.—*Studies on Vasomotor Nerves in the Lungs, W. Nishimaru, Okayama Igakkwai Zasshi, February, 1923, no. 297, Abstr. from Japan Medical World, August 15, 1923, iii, 192.*

Immunity in Tuberculosis.—Tubercle bacilli which had been defatted with chloroform, alcohol, ether, etc., ground into a fine powder and made into suspension, were used in preventive inoculation experiments. Animals which received several large intravenous injections of this material were subsequently inoculated, along with normal controls, with virulent tubercle bacilli but showed no difference from the untreated animals. There is no immunity to tuberculosis without infection with tubercle bacilli. The immunity appears not to be proved by antibodies, bacteriolysins, opsonins, complement fixation, etc., but is bound up in some way in the cells. Such animals are hypersensitive to tuberculin and react to the invasion of tubercle bacilli with an acute inflammation. This leads to a repulsion and removal of the invading bacilli. Immunity is a cellular affair and is dependent upon allergy. Protective *infection*, then, becomes rational and desirable, and recourse was had to an old bovine culture isolated by Behring in 1902. The culture is weakly virulent, but at times produces death in guinea pigs. Usually no tuberculosis develops. Guinea pigs, rabbits, sheep, cattle and donkeys were inoculated with this and other strains, and developed hypersensitiveness. Heterologous sera from such infections, however, produced no prophylactic or curative effect upon guinea pigs inoculated with virulent tubercle bacilli. Studies with homologous sera are in view.—*Experimentelle Untersuchungen zur Frage der Immunität und Schutzimpsfung bei Tuberkulose, P: Uhlenhuth, Deutsche med. Wchnschr., September 21, 1923, xlix, 1197.*

Allergy in Tuberculosis and Syphilis.—*1:* There is a specific allergy in tuberculosis, specific in the sense that it may be demonstrated by a specific product. There is also a specific allergy in syphilis, the evidence of which rests more with the tertiary phenomena of the disease than with skin reactions performed with preparations like luetin and palladin, which lack the specificity of tuberculin. *2:* There is also a nonspecific allergy in both tuberculosis and syphilis, as demonstrated by skin testing tuberculous and syphilitic individuals with certain ordinary nonspecific substances, such as the components of milk and some sera, etc. Milk and

tuberculin in the same tuberculous individual give practically the same result. Also in tertiary syphilis milk and luetin give almost identical results. There is, therefore, a hetero-allergy as well as an allergy. *3:* To throw light on any reciprocal action of tuberculosis and syphilis in the same individual, tertiary syphilitics were tested intracutaneously with tuberculin. The syphilitics who reacted to luetin and milk reacted to tuberculin with a violence often greater than did the tuberculous, although no evidence of active tuberculosis could be found either clinically or radioscopically in the syphilitic subjects.—*L'allergie dans la tuberculose et la syphilis, B. Dujardin and C. Duprez, Ann. de Méd., August, 1923, xiv, 161.*

Nonspecific Immunity in Chronic Pulmonary Tuberculosis.—The powers of resistance normally present in the body, and protective against various foreign bodies, constitute nonspecific immunity. According to Much, specific immunity has its field of action in the chronic infectious diseases and nonspecific immunity in the acute infectious diseases. Pulmonary tuberculosis falls in the group affected by specific immunity. If the resistance to general infection is broken, then a specific irritant acts only injuriously on the cells. In this case only nonspecific immunity will aid (hygienic-dietetic measures, nonspecific vaccines, fats and lipoids). A nonspecific agent can remove the injurious effects on the cells; at first nonspecific protective substances are formed and finally specific protective action can occur. Nonspecific immunity can play an important rôle therapeutically in pulmonary tuberculosis.—*Unspezifische Immunität bei der chronischen Lungentuberkulose, F. Mattausch, Beitr. z. Klin. d. Tuberk., December, 1922, liii, 453.*

Tuberculin Reaction.—V. Hayek summarizes his views as follows: 1. There are differences between the focal, general and local skin reactions, since these three groups run their course in part apparently independently of one another. The laws governing these have been presented previously. 2. A diminution in reaction-sensitiveness occurs not only in an unfavorable but also a favorable sense according as anergy is negative or positive. Negative anergy is the exhausted reaction-capacity, and an index of a broken-down resistance; positive anergy is the increased power of recovering lost reacting capacity. 3. Anergy is a relative conception, in individual cases dependent upon the amount and the special reaction of related preparations. 4. In progressive tertiary phthisis the sensitivity of the skin reactions mostly diminishes first, while local and general reactions can be retained until the most extreme disease stages. In positive anergy the reverse is usually the rule, and the sensitiveness of the skin is retained the longest. 5. Marked tuberculin hypersensitiveness indicates a strong protective reaction; this is not equivalent to "clinically ill," even though all the earmarks of an indefinite general feeling of ill health exist. 6. Two disease forms are distinctly circumscribed in their biological behavior. One is the generalized or juvenile tuberculosis (Ranke, Heller), that for years, in spite of complete clinical health, reveals more or less marked tuberculin hypersensitiveness, and in which the body resists a tertiary or isolated phthisis (Ranke). It precedes the second form, its development is completed, and with progress toward healing there occurs an increasing positive anergy, while with each recurrence the tuberculin hypersenitiveness again increases. 7. In febrile reactions the height of the temperature is not significant, since within wide ranges this indicates the individual reaction to the irritant. More decisive is the type of fever, above all the rapid or slow disappearance of the reaction.—*Zur Frage der Tuberkulindiagnostik, H. v. Hayek, Beitr. z. Klin. d. Tuberk., November, 1922, liii, 327.*

Theory of Focal Tuberculin Reaction.—Hypersensitiveness is attributed to the ability of the tuberculous tissue to react rapidly and form antibodies to the tuberculosis antigens in the blood. These antibodies are, in the first place, developed in places where the combat against small amounts of tubercle-bacillus protein has gone on, and where resistance has not been destroyed. The clinical perceptibility of the antibody production will depend on the quantitative relationship of the newly formed protective substance to the introduced and autogenous tuberculin. If the amount of tuberculin introduced into the circulation is too small, it is quickly decomposed beyond the toxic intermediate bodies and no reaction results. This also occurs if the amount of antigen introduced is large but the power of the body to produce protective substances is also great, and when no autogenous tuberculin is present which would neutralize part of the antibodies. The focal reaction occurs when the antibodies from the focal site entering the blood are not sufficient to decompose the "tubercle-bacillus protein" rapidly and completely to a nontoxic state.—*Zur Theorie der Herdwirkung des Tuberkulins, W. Rosenfeld, Beitr. z. Klin. d. Tuberk., March, 1923, liv, 344.*

Nature of Tuberculin Reaction.—The specificity of the tuberculin reaction may depend upon the presence in an infected animal's tissues of a substance with which tuberculin synthesizes to form a highly toxic compound. Since tuberculin acts in extremely high dilution it is unlikely that the tuberculin component of such a compound will ever be isolated from raw tuberculin by the methods of chemical analysis. On the other hand, suggestive leads are obtained from the synthetic chemistry of the alkaloids. Atropin is highly poisonous, but the two components into which it can be resolved by hydrolysis, atropin and phenyl acrylic acid, are practically nontoxic. However, Bergell finds that if mice are given preliminary treatment with either of these components and then injected with the other, the latter is ten times as toxic as for a normal mouse. For the "tropin-loaded" animal phenyl acrylic acid is a specific poison, and vice versa. The tuberculin reaction may be specific on a similar basis.—*Das Wesen der spezifischen Gifte, P. Bergell, Ztschr. f. physiol. Chem., 1922, cxxi, 231.*

Fever from Inhalation of Tuberculin.—In an ambulance, in which tuberculin was administered to patients in a confined space every 4 days, there developed among 6 physicians, 3 nurses and 2 orderlies symptoms resulting from the inhalation of the tuberculin, such as rise in temperature to 39°C., with exhaustion and weakness. On the days on which the patients received no tuberculin there were no or only slight reactions among the physicians. After a time there was found a firm, indolent splenic tumor in these cases but examination for malaria proved negative. The fever usually started during the winter months. It was occasioned by the use of concentrated tuberculin in open dishes, and by emptying air from the syringes used for injection, resulting in a spraying of the tuberculin into the air with which it was inhaled. The splenic tumor is believed to be a result of toxic action of tuberculin.—*Über eine Fieberendemie durch Einatmen von Tuberkulin, V. Kollert, Beitr. z. Klin. d. Tuberk., March, 1923, liv, 451.*

Action of Tuberculin on Serum Lipase.—With the idea that the prognosis in tuberculosis is more favorable the higher the titre of serum lipase, which is supposed to dissolve the waxy capsule of the bacilli, tuberculin was tested for its effect upon serum lipase. It was found to inactivate the lipase. Tuberculin, acting upon tuberculous guinea-pig serum, markedly decreased the lipolytic action (hydrolysis of tributyrin) and even normal serum was partly inactivated. The lipase of rabbit serum, on the contrary, was barely affected by tuberculin, while normal suckling's blood was markedly influenced and tuberculous blood more so. Prolonged heating destroyed the ability of tuberculin to lessen the lipolytic action of serum. The influence is not specific, since the lipase of nontuberculous serum was also inactivated; the reaction is probably chemical. It requires time and with higher concentrations of lipase the inactivation is diminished.—*Über die Beziehungen des Tuberkulins zur Serumlipase, C. Falkenheim and P. György, Beitr. z. Klin. d. Tuberk., November, 1922, liii, 250.*

Tuberculin in Experimental Tuberculosis.—Title only given.—*On the Influence of Tuberculin against Experimental Tuberculosis, A Preliminary Communication, K. Yoshizawa, Kekkaku Zasshi, April, 1923, v, no. 10, Title from Japan Medical World, December, 1923, iii, 274.*

Leucocytic Changes in Guinea Pigs after Tuberculin Injections.—Title only given.—*On the Changes of the Leucocytes in the Guinea Pig as Met with after an Injection of Tuberculin, T. Gaku, Saikingaku Zasshi, April, 1923, no. 331, Title from Japan Medical World, December, 1923, iii, 273.*

Criteria of Cure in Guinea Pig Tuberculosis.—The literature of tuberculosis is filled with the records of experiments dealing with the treatment of tuberculous animals, chiefly guinea pigs. For the most part the materials employed have not proved satisfactory, although a few authors report astonishingly good results. Hence, it seems necessary to scrutinize very carefully the experimental evidence on which these alleged favorable results are based. Two assumptions seem to underlie all these experiments: (1) That all guinea pigs react in the same way to the tubercle bacillus, and (2) that fibrosis or healing of local lesions indicates with certainty the cure of the individual. Both these assumptions are false. In the first instance the reports of the Royal Commission on Tuberculosis make it clear that individual guinea pigs differ among themselves in their reaction to *B. tuberculosis*. With regard to the second assumption it is a commonplace in the postmortem room to find fibrosed and encapsulated caseous tuberculous lesions in the lungs or other organs associated with an acute local or generalized exacerbation of the disease. Hence, if guinea pigs are to be used as subjects for the investigation of the therapeutics of tuberculosis, it is essential to establish standards

by which it is possible to control and estimate the value of the results. On these grounds exception is taken to Prof. G. Dreyer's recent article in which it is claimed that "treatment with defatted antigen brings about a definite improvement, both general and local, in animals infected with *B. tuberculosis*." A critical examination of this work provides really little evidence of the value of his antigen as a curative agent. It is not impossible for untreated animals infected with the same strain to survive as long as Dreyer's treated animals. Finally, the naked-eye and microscopic examinations of the animal that died were not controlled by similar investigations of untreated guinea pigs. An attempt was made to repeat Dreyer's work on guinea pigs, using a bacillary emulsion as well as the diaplyte antigen. In each experiment the animals were divided into approximately equal batches, one of which served as the control. It was found that areas of fibrosis and natural healing may occur in infected guinea pigs without any form of treatment at all; the individual guinea pigs may differ widely in their response to infection with tubercle bacilli; and that, despite treatment, every guinea pig infected with living tubercle bacilli presented progressive tuberculosis postmortem. *Conclusion:* The evidence which is usually brought forward in demonstration of the cure of tuberculosis in guinea pigs is invalid. Such indications of healing as have been described occur naturally in untreated animals; further they do not indicate any increased resistance to the tubercle bacillus in the animal itself, for they are local in their manifestations and are associated with the progress of the disease elsewhere in the body. The original observations in support of Dreyer's treatment are, in the absence of adequate controls, quite inconclusive and the question whether or not this antigen is of value in the treatment of tuberculous guinea pigs can only be answered by further experimentation. Details of the experimental work with accompanying charts are given.—*The Criteria of Cure in Tuberculosis of the Guinea Pig with Special Reference to Diaplyte Antigens, E. H. Kettle, Lancet, January 12, 1924, ccvi, 68.*

Blood Picture of Tuberculosis at High Altitudes.—By means of the microcapillary method of Müller and Weiss it was decided to obtain information on whether the increase in hemoglobin and erythrocytes was an actual increase in these elements or was due to circulatory changes alone. In normal individuals examined at low and high altitudes there was no difference in the capillary picture and, contrary to Bunge's and Zuntz's views, the increase in hemoglobin and erythrocytes is an actual increase. In surgical and pulmonary tuberculosis, during the early stages, the capillary circulation does not appreciably deviate from the normal, but in advanced cases it is either hastened (in general, in cases with relatively favorable or questionable prognosis) or markedly retarded (cases of bad prognosis).—*Das Blutbild der Tuberkulose im Hochgebirge. II. Der Capillarkreislauf im Hochgebirge bei Gesunden und Tuberkulösen und seine Beziehung zu der in der Höhe beobachteten Blutkörperchen- und Hämoglobinvermehrung, H. Finsterwald, Beitr. z. Klin. d. Tuberk., February, 1923, liv, 239.*

Blood Pressure in Tuberculosis.—Blood pressure examinations were made on 160 tuberculous patients of various types and ages. In the more advanced stages of pulmonary tuberculosis there occurred a marked lowering, which was looked upon as the cause of night sweats. In cases that had hemoptysis there was an increase of blood pressure, which developed even two or three days before the occurrence of the hemorrhage and lasted after the hemorrhage, gradually returning to normal. Menstruation had the same effect as pulmonary hemorrhage. Calcium chloride and adrenalin hydrochloride are considered contraindicated in pulmonary hemorrhage because of their tendency to increase pressure. —*On the Blood Pressure in Phthisis and the Meaning of Blood Pressure on the Therapy, Y. Kogame, Tokyo Igakkwai Zasshi, February, 1923, xxxvii, no. 2, Abstr. from Japan Medical World, August 15, 1923, iii, 192.*

Growth of Tubercle Bacilli Submerged in Fluid Media.—Besredka found that in various egg-yolk culture fluids there occurred an increase of submerged tubercle bacilli. This is believed to be due to the high content of egg yolk in organic phosphorus combinations. This seems to be the case, since in culture media containing 2 per cent glycerol and ground rabbit's liver a good submerged growth occurred. Likewise, submerged growth occurred in sterilized cow's milk, with and without 2 per cent glycerol, although not as profuse as in liver. The Besredka medium was modified as follows: 1 part egg yolk mixed with 60 parts of tap water and sterilized for 1 hour in the Arnold steam sterilizer on 2 successive days. Cultures were obtained in this egg yolk medium directly from sputum. Blood from tuberculous individuals gave negative results.—*Über die submerse Vermehrung der Tuberkelbacillen in flüssigen Nährböden. II Mitt., E. Boecker, Ztschr. f. Hyg., 1923, xcix, 121.*

Metabolism of Tubercle Bacilli.—To damage the tissues, the tubercle bacillus must be able to grow and multiply. One must know more about its chemical changes and metabolism of the infectious agent than the mere growth of bacilli on culture media indicates. Bacilli require sulphur, phosphorus and magnesium, and they grow better if potassium is also present. They grow well if carbon is supplied as acetic acid and if their nitrogen occurs in simplest form (ammonia) but they cannot get nitrogen from the amino acids directly if this is the only source of the nitrogen. They require free oxygen. There is no fundamental difference in the metabolism of the three pathogenic strains,—human, bovine and avian, which are related closely to one another and may be different strains of the same race.—*Der Verwendungsstoffwechsel des Tuberkelbacillus, H. Braun and S. Kondo, Klin. Wchnschr., January 1, 1924, iii, 10.*

Cultural Differentiation of Acid-Fast Bacteria.—Various substances were added in different dilutions to 4 per cent glycerol-agar to determine their effects upon pathogenic and saprophytic acid-fast bacteria. Genuine warm-blood tubercle bacilli were found more susceptible to chemical substances than the saprophytic varieties. Susceptibility to chemicals parallels pathogenicity. There are, however, strains that deviate from this rule. There also appeared relationships between the saprophytic and pathogenic varieties.—*Versuche zur kulturellen Differenzierung der säurefesten Bakterien, H. Schlossberger and R. Prigge, Ztschr. f. Hyg., 1923, xcix, 186.*

Action of Lymphocytes on Tubercle Bacilli in Vitro.—A direct relationship between lymphocytosis and healing tendency of the tuberculous process is established. Experiments show that this favorable influence of the lymphocytes is to be attributed to their ferments. Pawlaw obtained lymphocytes by injecting tuberculin, first mixed with aleuronat and later alone, into the pleural cavity of dogs. Extracts of 1:1 or 1:2 strength were made, by the procedure of alternate freezing and thawing, and by long standing. A drop of extract was mixed with a drop of fresh guinea-pig serum on a glass slide, and to this a suspension of killed tubercle bacilli was added. After one and a half to two hours in the thermostat at 58°C, Ziehl staining showed great changes in the structure of the bacilli in all of the 80 experiments made. Either a splitting of the bacilli occurred or they were heaped in masses and finally broken up into detritus. Control preparations of serum and bacilli, alone or mixed with salt solution, showed only normal bacilli.—*Einwirkung von Lymphozyten auf Tuberkelbazillen in vitro, M. Pawlaw, Ztschr. f. Immunitätsforsch. u. exper. Therap., October 10, 1923, xxxviii, 181.*

Antigenic Properties of Cold-Blooded Acid-Fast Bacilli.—Specific tissue changes in the warm-blooded body are the basis of tuberculosis protection. The result of an immunizing inoculation with cold-blooded bacilli must, therefore, be dependent upon the biological activity of the bacilli and their ability to elicit in warm-blooded animals a specific tissue reaction to tuberculin. It is, therefore, evident that the reaction should also occur to warm-blooded tubercle bacilli. Various cold-blooded bacilli were tested in children and guinea pigs. Turtle, snake, frog, and fish bacilli could so affect the warm-blooded body that it reacted specificially to the strain utilized. The human body gave a local reaction to tuberculin prepared from the cold-blooded bacilli, but not (or only in the exceptional case) to tuberculin from the human bacillus. The human body proved more reactive than the animal body. The turtle and fish bacilli were biologically most active. Tuberculous children and tuberculous guinea pigs reacted positively to all the tuberculins. In this respect the Friedmann bacillus showed no advantages. The most marked tissue changes occurred with the human bacillus.—*Über die antigenen Fähigkeiten verschiedener kaltblüter Tuberkelbacillen und die Erkennung der durch sie bewirkten spezifischen Gewebsumstimmung mittels der Tuberkulinreaktion. Zugleich ein Beitrag zur Frage der Stellung des Friedmannbacillus im System der säurefesten Stäbchen, Selma Meyer, Ztschr. f. Hyg., 1923, xcvii, 433.*

Virulence of Saprophytic Acid-Fast Bacilli.—Large doses of various strains of nonpathogenic acid-fast bacilli were inoculated intraperitoneally into guinea pigs. These were killed in from twenty to sixty days and showed no signs of having been seriously affected.—*Zur Frage der Virulenzsteigerung der saprophytischen säurefesten Bacillen, P. Rondoni and P. G. Dal Collo, Klin. Wchnschr., August 6, 1923, ii, 1504.*

Acid-Fast Bacillus Isolated from Rat Leprosy.—Five strains of acid-fast bacilli were isolated from the lesions in albino rats by means of antiformin.—*On a Strain of Acid-Fast Bacillus Isolated from Rat Leprosy, M. Uchida, Saikingaku Zasshi, January, 1923, no. 328, Abstr. from Japan Medical World, August 15, 1923, iii, 190.*